THE GEOGRAPHICAL JOURNAL

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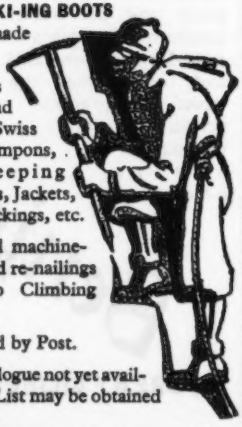

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THE FALKLAND ISLANDS DEPENDENCIES SURVEY: EXPLORATIONS OF 1947–48

D. P. MASON

THE FALKLAND ISLANDS Dependencies Survey (F.I.D.S.) has been in existence since 1943 when, under the title of "Operation Tabarin," a party under Lieutenant-Commander J. W. S. Marr, R.N.V.R., left this country in December and established Antarctic bases on Deception Island in the South Shetlands, and on Goudier Islet in Port Lockroy. It had been hoped to establish a base on the mainland of Graham Land but the lack of a suitable ship delayed this until February 1945 when a base was set up at Hope Bay, at the extreme northern end of the peninsula. The other two bases were also maintained during the 1945–46 season, when the operation was under the command of Captain A. Taylor, of the Royal Canadian Engineers. With the end of the war in 1945, the scope of the expedition was extended and the code name "Operation Tabarin" dropped; the expedition was transferred from the Admiralty to the Colonial Office and took its present title. Surgeon Commander E. W. Bingham, R.N., took over the command, and in January 1946 the three bases already existing were remanned and restocked and a new base established on Laurie Island in the South Orkneys; in February a sledging base was set up on Stonington Island, in Marguerite Bay, to form the headquarters of the Survey. In the following year further bases were established in the Argentine Islands, at Admiralty Bay in the South Shetlands and on Signy Island in the South Orkneys.

Only Hope Bay and Stonington Island were sledging bases; the others being primarily meteorological stations. The hut at Stonington Island, which has featured prominently in recent press reports of the "marooned scientists" under Dr. Fuchs, was within four miles of Rymill's 1936 base on the Debenham Islands and 200 yards from the huts erected for the East Base of the United States Antarctic Service in 1940–41. The site had been chosen because all-the-year-round access to the mainland of Graham Land is there possible, for the front of Northeast Glacier extends to the island and presents an easy slope. This glacier face has receded considerably since 1941, and it is possible that in a few years the island will no longer be connected to the mainland by the glacier.

The Antarctic Winter of 1947

When Commander Bingham was forced to return home in March 1947 owing to ill-health, Major K. S. P. Butler took over the leadership of F.I.D.S. and an Auster "Autocrat" aircraft was sent to Stonington Island to carry out reconnaissance and assist with depot-laying. Fortunately, the ice conditions caused Marguerite Bay to be open early in February and the *M.V. Trepassey* reached Stonington Island on February 5.

When the *Trepassey* had been unloaded and a hangar erected for the aircraft, the first sledge party was able to set out on March 2, to complete its journey before the hours of daylight became too short. The party consisted of J. E. Tonkin (leader), D. P. Mason (surveyor), E. W. K. Walton and A. R. C. Butson; its object was to find a suitable route down to the shelf ice on the east coast of Graham Land. It was to have been supported by the newly arrived Auster, both for reconnaissance and possibly for flying further supplies. Unfortunately the aircraft skis did not arrive until the second visit of the *Trepassey* on March 31, too late to be of any assistance. The party was away for six weeks, reconnoitred six possible glacier routes to the shelf ice between 68° 05′ S. and 67° 30′ S., and covered nearly 300 miles. Only two glaciers, one in 67° 30′ S. and the other in 68° 05′ S., offered possible sledging routes. The former was the better route, but the latter more convenient, as it was almost in the same latitude as the base; it was, in fact, the route followed by the east coast sledge party of the United States Antarctic Service in 1940–41. We did not discover it until our stores were practically exhausted, which emphasizes the value of air reconnaissance; for an hour's flight in the Auster would have revealed it and the sledging time could have been more usefully employed. As it was, some gaps left during the previous year's survey of the area were filled and much information gained which enabled it to be "tied in" to a subsequent survey made from the east coast shelf ice.

At Hope Bay, where F. K. Elliott had taken charge of the base from Captain Russell, sledging was also being done before winter set in. Being farther north, this base had longer hours of daylight and in May a survey journey was made to complete an area left blank in the previous year's work on the west side of Crown Prince Gustav Channel. The party consisted of F. K. Elliott (leader), S. J. Francis (surveyor), R. J. Adie (geologist) and M. A. Choyce and was out for twenty-nine days, covering 163 miles. This may not sound very impressive, but their purpose was to complete the survey of the area and this they succeeded in doing, despite bad weather. Three journeys were later made to View Point on the south side of Duse Bay, to lay a large depot of stores in readiness for the following summer's work.

While the Stonington Island party was away, the *Trepassey* and the *R.M.S. Fitzroy*, which was on charter to the Survey from the Falkland Islands Company, carried out the annual routine inspection, remanning and restocking the various bases. The United States Ronne Antarctic Research Expedition (R.A.R.E.) arrived at Stonington Island and reoccupied the former American base. After a certain amount of preliminary coolness, which was understandable in view of the state in which third parties had left the huts, the two expeditions got to know each other very well and the leaders, Major

A halt on the march, autumn

Front of Northeast Glacier, near Stonington Island

The base hut at Stonington Island, spring 1947

Butler and Commander Ronne, drew up a programme for cooperation during the coming sledging season.

Those who had not yet spent a winter in the Antarctic were speedily robbed of any illusions they may have had of the "long winter's night" with little to do. Both sledging bases had young dogs to break to harness and train for the season's work; sledges had to be made up, man and dog rations prepared, harnesses and traces made, and all the thousand and one odd jobs carried out which cannot be avoided or left half done in preparation for a summer's sledging. At Stonington Island the arrival of the Ronne party, and the subsequent agreement to work together wherever possible, led to a change in the plans drawn up at the beginning of the year.

The Americans had unfortunately lost most of their best dogs through distemper on the journey down, but they had three aircraft (a Noorduyn Norseman, a twin-engined Beechcraft for photography, and a Stinson L–5 for reconnaissance) against the solitary F.I.D.S. Auster. They had the aircraft, F.I.D.S. had the dogs; and a joint sledging programme was worked out to include three journeys, two from Stonington Island and one from Hope Bay. One of the former was a completely American effort, to enable the American geologist, Dr. Nichols, to work on the sedimentary rocks of northern Alexander I Land; the second was a joint British-American sledge party, composed of two men from each expedition, to make a journey along the shelf ice on the east coast as far south, it was hoped, as 75° S. or even farther. Both parties were to be supported by aircraft; the east coast party were to use F.I.D.S. dog teams and British equipment, and were to establish ground control for a trimetrogon air survey which would be carried out by the R.A.R.E. Beechcraft. The party from Hope Bay was to sledge down the Larsen shelf ice, surveying the coast, and make a rendezvous with a guide party from Stonington Island at Three Slice Nunatak on about December 25. These two parties would then return to Stonington Island together.

To enable better weather forecasting for the long exploratory and survey flights which Commander Ronne intended to make, two meteorological stations were set up: one at an altitude of 5600 feet on the Graham Land plateau, about 17 miles east-north-east of Stonington Island, the other on the shelf ice, in about 68° 47′ S., 63° 15′ W., off a cape marked on some American charts as "Cape Keeler." The former was manned by one F.I.D.S. observer, and one R.A.R.E. observer; the latter was to act also as an advance base for the aircraft; and both stations were to serve as depots for the sledge parties. During July, the R.A.R.E. sledged supplies to the site chosen for the first station; a first attempt was unsuccessful, and two men were left on the plateau at an altitude of 4700 feet while the rest of the party returned for fresh supplies. Bad weather set in, their tent was badly damaged and, while returning to base on foot, one of them fell a hundred feet down a crevasse. His companion marked the spot and arrived at the base alone in the dark. Fortunately it was a clear night with full moon—the only night like that for several days—and parties from both camps, after a few hours' searching, found the missing man. Butson, the F.I.D.S. medical officer, was lowered and succeeded in freeing the American who, luckily only slightly hurt, recovered completely from his experience after a few weeks' rest. For this feat Butson was awarded

the Albert Medal; Walton had been awarded the medal for a similar deed almost exactly a year before. The station was successfully established at the second attempt and further supplies and the two observers were flown in. To enable the sledge party to make the severe climb from sea-level to the summit of the peninsula with light loads, the Auster carried supplies up to form a depot. In one day, with limited daylight, the Auster flew in 1200 lb. of supplies; in the previous year, nearly three months of toil had gone to carrying only four times that amount up by man and dog hauling.

It was planned to fly men and supplies to the advance base on the east coast early in September, and petrol and a large sledging depot at a later date. The depot was to contain forty-two days' supplies; a similar depot was to be flown to the vicinity of Cape Knowles, about 220 miles farther south; and another, of twenty days' supplies, to Mount Tricorn, then believed to be in latitude 74° 40′ S. These depots were to have had a total weight of nearly 5000 lb. but, owing to the subsequent events, they were considerably reduced.

During August, a party sledged to the head of Neny Fjord to investigate the valley leading south-east from there. In this valley, which cuts across the peninsula to the head of an inlet in latitude 68° 32′ S., a maximum height of only 3100 feet would have to be attained instead of 5600 feet by the route up Northeast Glacier. The valley had been followed by Ronne and Eklund in returning from King George VI Sound in 1941 and, as well as saving much climbing, it would have cut many miles off the distance from Stonington Island to the advance base. Flights had shown that although the valley was heavily crevassed near the head of the fjord, the remainder would present no trouble; but the ground party found no safe route through the bad area. Side slopes, glare ice, weakly bridged crevasses and seracs caused by steep side glaciers spilling into the valley, would make a sledge journey through it a most hazardous business. Another possible route down to the east coast was examined and photographed from the Auster; this was a long smooth glacier, crevassed near its mouth, but with a possible route through the crevasses. As it would not be possible to reconnoitre it from the ground before setting out on the long journey, it was decided not to attempt the passage of this glacier either, and the Auster flew a depot to the meteorological station on the peninsula, on the route to the glacier which had been examined and proved in April.

In preparation for their journey south to Marguerite Bay, the Hope Bay party made a depot-laying journey to the Seal Nunataks in August. Luckily, since they started out with extremely heavy loads which were as much as 1600 lb. for a ten-dog team, they had an extraordinary spell of fine weather and well-nigh perfect surfaces which enabled good daily mileages to be made. They were away from base for twenty-four days, covered 352 statute miles and successfully laid a large depot at one of the nunataks. Only two days were lost through bad weather, and much survey and geological work was carried out.

The Summer Sledge Journeys of 1947–48

On 15 September 1947, the Auster and the Norseman left Stonington Island to establish the advance base on the east coast, the Auster going first to

select a suitable landing site and lay out a strip for the heavily laden Norseman. The crew of the American aircraft missed the Auster, which had landed at the rendezvous, and as they could see bad weather closing in from the north, turned back for the base. They landed safely, but then the weather shut right down over the base, with no sign of the Auster and no wireless message. This was hardly surprising, in view of the very low power of the transmitter in the Auster. Commander Ronne immediately placed all his aircraft and resources at the disposal of Major Butler. Three days later, which was as soon as the weather permitted, search flights were made in the area in which it was expected that the Auster would be, and a base was established on the shelf ice off the east coast so that the search could be continued even when there was bad weather over Stonington Island. On the ninth day the three members of the crew were sighted from the Norseman, on the sea ice of Marguerite Bay on the west coast, about 20 miles south of the base, and were soon picked up and flown back. They had seen the American aircraft on September 15, and had watched it fly northwards as if returning home. They immediately took off, but ran into bad weather and the pilot wisely decided, since they could make no progress towards the base against the powerful head wind, to make for the sea ice off the west coast instead of attempting a landing in the mountainous interior. They crossed the coast but, coming in to land in very poor visibility and drift, one ski touched a bergy bit and the aircraft turned over on to its back. None of the crew was hurt although the Auster was irreparably damaged. The following morning they found that they had landed just south of Cape Berteaux, 80 miles from home, and they set out with a light tent and their emergency rations to walk back. In nine days they had covered 60 miles in deep soft snow and slush, with little food although they had been able to kill a seal, and they were very tired. The help given by Commander Ronne and all members of his expedition and particularly his two pilots, Captain Lassiter and Lieutenant Adams of the U.S. Air Force, who did magnificent work in flying conditions which were never even moderately good, cannot be over-estimated. The search moreover used up a large quantity of valuable fuel and might thus have jeopardized the success of the long flights planned for the summer.

The geological party left during September for the northern end of King George VI Sound, with the R.A.R.E. dog team; supported for the first twelve days by Walton and Butson with one F.I.D.S. team. The party returned to Stonington Island in December, having covered 450 miles in ninety days.

The southern journey

The joint F.I.D.S.-R.A.R.E. sledging party left Stonington Island on October 9 with three sledges and three nine-dog teams. Its members were Mason (leader and surveyor) and Butson, both of F.I.D.S., and N. McClary and A. Owen, of the R.A.R.E. Bad weather, a broken sledge, and a broken collar-bone for McClary, delayed progress during the early stages and involved a return to base; and then more bad weather delayed our start from the plateau weather station until October 25. After this unfortunate start things went better and, with loads averaging 900 lb. per sledge, the glacier

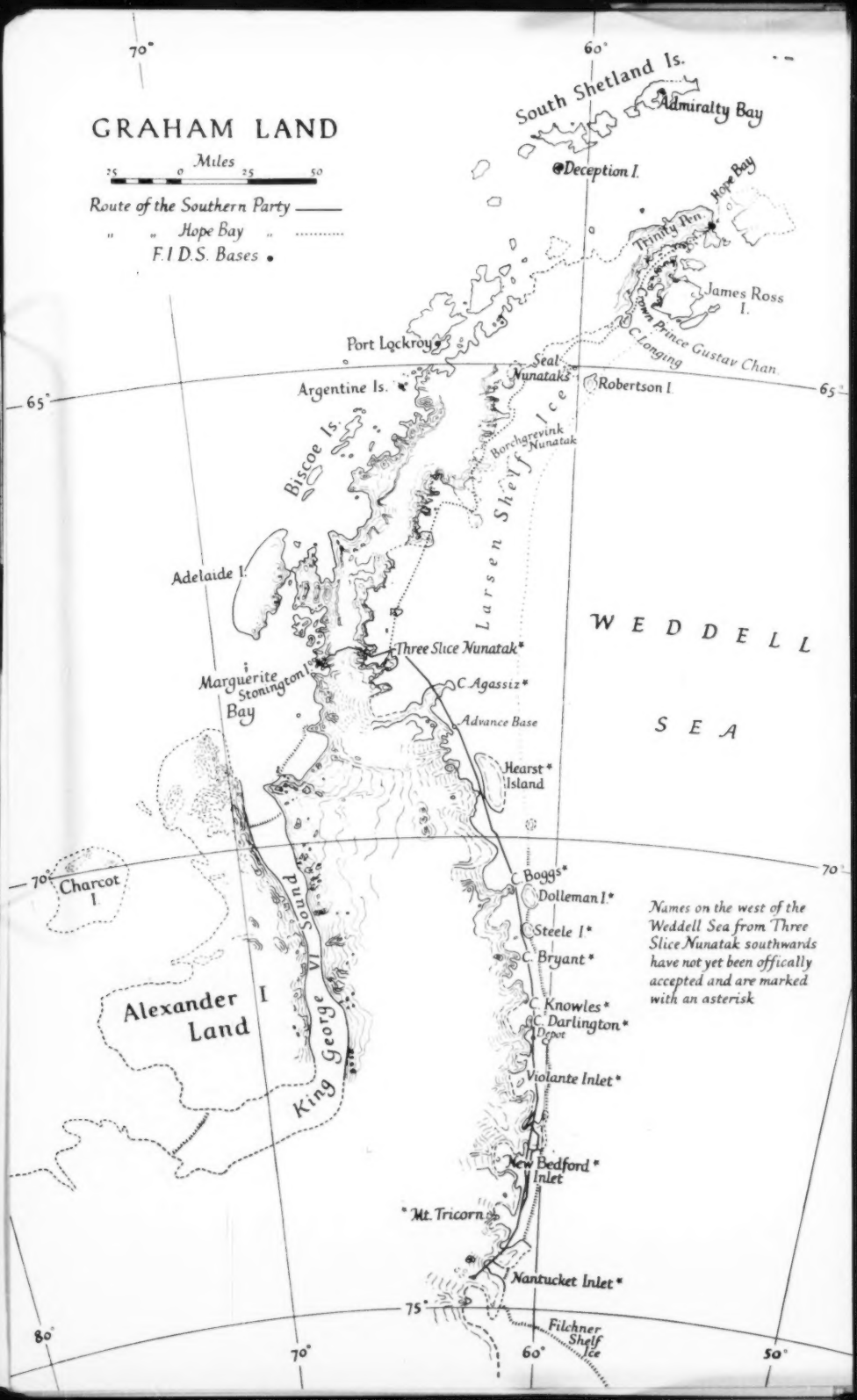
to the shelf ice was traversed without incident. Three Slice Nunatak was reached on October 29. Here a small depot of dog food was left for the Hope Bay party and another for our own party on its return. With lighter loads and good surfaces, we covered the next 82 miles to the depot at the advance base in five days, travelling on four. This part of the journey was made over thick shelf ice, which varied in height from about 370 feet at the nunatak, to 70 feet at the advance base. The surface was gently undulating and, apart from an area seaward of the nunatak, free from crevasses. During the search for the Auster in September, it had been seen that the shelf ice in the large inlet between Three Slice Nunatak and Cape Agassiz contained a number of lenticular holes in lines running east and west, which seemed to lie along longitudinal cracks formed as the flow of ice diverges towards the mouth of the inlet. One of the holes had been inspected on the ground in September; it was about 50 yards long from east to west, and about 10 yards across; the south side was sheer with a cornice, but the north side was lower and a smooth snow slope led to the bottom of the hole, which was about 10 feet deep. But all these holes were west of our route; the only one we saw (lat. 68° 21′ S., long. 63° 58′ W.) seemed of a different nature from the others. It was about 100 yards from north to south, 50 yards wide and 70 feet deep, with sheer sides to the snow-filled bottom; no water or sign of flooding was visible. We then climbed to 1000 feet across the peninsula of Cape Agassiz, 20 miles north of the advance base; the peninsula is completely ice-covered, rising gently from the shelf ice to the north, with steeper slopes on the south. There was no crevasse or tide crack at the junction of the shelf ice and the land ice, which merge imperceptibly, showing that the shelf ice is here aground. There was a shallow but wide depression around the Cape, as at the junction of the shelf ice and land ice in King George VI Sound, noted by Stephenson and Fleming in 1936.

At the advance base Major Butler took charge of the party, having flown over a few days before. He took the place of Butson; and Smith, of the R.A.R.E., took over from Wood, who had replaced McClary after the latter's accident. Full loads, averaging 1000 lb. a sledge, were picked up and, after some delay in bad visibility in a rifted and crevassed area just south of the advance base, excellent progress was made down the strait separating Hearst Island [1] from the mainland. North of Three Slice Nunatak, the coast is marked by piedmont ice along the foot of sheer rock cliffs, 3500 to 4000 feet high. South of the advance base, the peninsula widens and falls in a series of terraces from the heights of the interior, with isolated peaks projecting through the ice-cap. A rift in the shelf ice was encountered off the southern end of Hearst Island in latitude 69° 47′ S. It was about 400 yards wide and 40 feet deep, the walls sheer in parts but drifted up in others, so that it was easily crossed by the sledges. The floor was at sea-level, for an open crack containing sea water was found running up the rift. Many large blocks were frozen into the floor, some of them stained by marine diatoms. A similar rift was found about 10 miles farther south and a Weddell seal was killed near the open crack in its floor; its flesh much appreciated by the dogs, who had gone thirty-five days on pemmican. A detour had to be made westwards

[1] See *Geogr. Rev.* 38 (1948) 475–86, for a discussion of the identity of Hearst Island.

Departure from the most southerly camp

Camp on Northeast Glacier


GRAHAM LAND
Miles
25 0 25 50
Route of the Southern Party
" " Hope Bay "
F.I.D.S. Bases
70°
60°
South Shetland Is.
Admiralty Bay
Deception I.
Hope Bay
Trinity Pen.
James Ross I.
Crown Prince Gustav Chan.
C. Longing
Port Lockroy
Seal Nunataks
Robertson I.
65°
Argentine Is.
Biscoe Is.
Larsen Shelf Ice
Borchgrevink Nunatak
Adelaide I.
WEDDELL SEA
Three Slice Nunatak*
Marguerite Bay
Stonington I.
C. Agassiz*
Advance Base
Hearst* Island
70°
Charcot I.
Boggs*
Dolleman I.*
Steele I.*
C. Bryant*
Alexander I Land
Sulzberger Bay
King George VI Sound
C. Knowles*
C. Darlington*
Depot
Violante Inlet*
New Bedford* Inlet
Mt. Tricorn*
Nantucket Inlet*
75°
Filchner Shelf Ice
80°
70°
60°
50°
Names on the west of the Weddell Sea from Three Slice Nunatak southwards have not yet been officially accepted and are marked with an asterisk

along the north side of this rift before a snow bridge was found at a point where it decreased in width; it did not appear to continue far to the west beyond the crossing point.

Beyond latitude 70° S. the shelf ice became thinner and appears to be of much more recent origin than that north of the rifts. There is no tide crack at the junction of the shelf and the land ice in the strait between Hearst Island and the mainland. The shelf ice is therefore aground; but south of the rifts it is afloat. In many places, the surface is not more than 5 feet above sea-level, with many open cracks containing sea water and much evidence of rafting along the edges of the cracks. Many small tabular bergs were frozen into the shelf ice at about 70° 15′ S., 61° 30′ W. On one of these a depot was laid for use on the return journey, to enable better progress to be made with lighter loads. In twelve days from the advance base, travelling on ten, we had covered 125 miles. After leaving this depot, we covered 68 miles in four days, and on November 20 the Norseman flew down a supply of forty days' rations and thirty days' dog food. This was less than we had hoped for but, because of the unforeseen expenditure of fuel during the search for the missing Auster, petrol for future use had to be carried at the same time. After landing at the sledge party's camp site, the plane flew on 60 miles farther south to lay the depot. During this flight, it was seen that "Darlington Island" of the then existing maps is in fact a cape; and that the shelf ice southwards from about 70° 30′ S. is only about 10 miles wide with a belt of open water separating it from the frozen pack of the Weddell Sea. We covered the 60 miles to the depot in four and a half days, resting one day to feed the dogs on a seal shot at an open water crack; we were now travelling by night to profit by the better surfaces when the sun was low, for it was above the horizon twenty-four hours every day.

We left the depot with loads averaging 950 lb. per sledge and, 60 miles farther south, found an ice-covered peninsula rising to about 1500 feet and projecting into the pack ice of the Weddell Sea, to form a southern limit to the Larsen shelf ice. Along the north side of this peninsula, the shelf ice was again aground. There is another shelf south of the peninsula. Ten days after leaving the depot, when we had covered 135 miles, we made a dump of unnecessary gear and a depot of food for the return journey. With light loads we pushed on and another day's run brought us, unexpectedly, to the mouth of the inlet at whose head stands Mount Tricorn, 50 miles north-north-west of the position in which it was shown on the existing maps. Here we shot another seal, and advised the advance base by wireless that the weather was suitable for flying. The Norseman and Beechcraft flew down, but were unable to bring any sledging supplies owing to the shortage of petrol.

Two days were spent at this camp, waiting for fine weather for the Beechcraft to make a flight to the south. We then continued our journey and, four days later, reached the summit of a peninsula at a height of 2000 feet, in 74° 42′ S., 62° 30′ W. Here our most southerly camp was made and we halted a day to survey and collect rocks. In sixty days, travelling on forty-seven, we had covered 613 statute miles from Stonington Island.

Just south of the peninsula on which the camp was sited there was a large inlet with a long wide glacier, apparently uncrevassed, flowing into its head.

Sledge routes. The map is based on the F.I.D.S. 1: 500,000 series by courtesy of the Director of Colonial Surveys

To the west the land was ice-capped, rising to about 5000 feet and with many isolated peaks breaking its gently undulating monotony. From farther north a line of ice cliffs forming the seaward edge of the Filchner shelf ice had been seen, leading southwestwards from the peninsula towards the horizon.

A return journey always seems an anti-climax as there is no new ground to be broken; but there were gaps in the survey to fill, and rocks to collect whenever possible. Good weather and good surfaces were the rule rather than the exception, and the 587 miles of the return journey, following almost exactly the same route, were covered in thirty-eight days, travelling on twenty-eight—a total sledging distance out and home of 1200 statute miles in ninety-nine days, with seventy-five travelling days.

During this homeward journey, rocks and lichens were collected at a cape in latitude 72° 20′ S.; a tide crack in the ice, exhibiting diatomaceous staining, was seen round the cape. At Cape Bryant (71° 12′ S.) more rocks, lichens and mosses were collected, and another tide crack was seen. Bergs frozen into the shelf ice off Cape Bryant were weathered into fantastic shapes, and the melt water in the bottoms of depressions around the bergs was found to be brackish. Seaweed was collected in latitude 70° 30′ S. in a wide open crack and more rocks were collected in latitude 69° 30′ S. from a cape opposite Hearst Island.

Except by direct comparison with sea-level at a nearby open crack, it was impossible to determine the height of the shelf ice accurately; it was of course useless to compare individual barometric pressures in the field with mean sea-level pressures at the expedition bases. Off the mouths of inlets, the shelf ice was generally very undulating, if not actually broken up; and the barometer often indicated a difference of 100 feet from trough to crest; on one crest, off the mouth of New Bedford Inlet, a height of 170 feet above sea-level was obtained. North of the rift in latitude 69° 47′ S. no accurate height determinations were made; the figure of 370 feet at Three Slice Nunatak being obtained by a comparison of barometer readings over several days, while the guide party was awaiting the arrival of the party from Hope Bay, with the readings at Stonington Island.

The northern journey

The party from Hope Bay, comprising F. K. Elliott (leader), S. J. Francis (surveyor), M. A. Choyce (meteorologist) and R. J. Adie (geologist), set out on October 19, but after covering over 40 miles in two days on perfect surfaces, it was forced to return to base as the bridges of the sledges, of poor quality wood, were breaking down. They set out again on October 26, but during this week's delay the surface had deteriorated in a most extraordinary fashion; over 2 feet of soft snow had fallen, and high temperatures had caused great lakes of melt water to form in Crown Prince Gustav Channel. They took eleven days to cover the 100 miles to Cape Longing, which they had hoped to reach in five—eleven days of miserable, wet sledging with men wading at times up to their knees, relaying loads over the worst patches, and pitching their tents on the drifts in the lee of bergs: the only dry places to be found. Once south of Cape Longing, conditions improved. By November 13, the party was off the mouth of Wilkins' "Hectoria Fjords," which were discovered to be an immense bight in the coastal escarpment,

filled with glacier ice through which Nordenskjöld's "Tilberg Islands" projected as nunataks. Here the party again met with areas of melt water, covered with a thin layer of new ice, in the undulations of the shelf ice.

The depot at the Seal Nunataks, laid in August, was collected without incident, and with full loads the party again pushed on. These nunataks were found to be fourteen in number, of which five were unnamed; those already named by Nordenskjöld were identified from his map and descriptions. The east coast of Graham Land is here marked by an almost sheer rock escarpment, rising to 5500 feet above the level of the shelf ice, with a narrow fringe of piedmont ice between. On November 26, the party camped near Cape Disappointment; here they ran into the extensive crevasses which had forced Nordenskjöld to abandon his attempt to reach the cape and collect geological specimens. With good light they were able to find a route through to the rock. Wilkins' "Crane Channel" was found here—a long narrow glacier in a deep trough lying 100 miles north-north-east of the position in which Wilkins reported it. This was not realized at the time, but a later comparison of the photographs taken during the journey with Wilkins' own photograph provided a positive identification.

On December 5 the party reached Borchgrevink Nunatak, the southernmost point reached by Nordenskjöld in 1902. His "Philippi Ice Plateau" was found to be a broad ice-covered cape projecting eastwards from the mainland and reaching a height of about 1200 feet; the mainland coast was still marked by the prominent escarpment, but here rocky ridges run eastwards from it towards the shelf ice, with glaciers flowing between them.

Poor visibility delayed travel and survey work on many days, but there were few areas in which the coastline was not determined, at least approximately; the high coastal escarpment masked inland features from the party on the shelf ice in many places. By December 18 the party was between Jason Island and the mainland; but the poor visibility prevented them from seeing whether this island and what was taken to be Larsen's "Veier Island" [1] were in fact one large island or two. The dogs, not having had the benefit of fresh seal meat, were now tiring and making rather heavy weather on surfaces which were beginning to deteriorate under the summer sun; persistent low cloud made surveying and route-finding difficult, and it was impossible to wait to carry out a more complete survey owing to lack of supplies. The rendezvous with the guide party at Three Slice Nunatak was reached on December 30 when the Hope Bay party had only one day's rations in hand. Little survey of the mainland had been done for the last 50 miles; but a later correlation of azimuths, bearings and photographic panoramas with the bearings and azimuths taken on the mainland during March and April by the reconnaissance party, has since enabled this "missing" portion of the coastline to be filled in in very fair detail.

The two parties arrived at Stonington Island together on 5 January 1948; the party from Hope Bay had covered 535 miles in seventy-one days; not including relaying and trips made for geological purposes, which added another 85 miles to the total. The guide party had been out for thirty-one days, and had covered nearly 250 miles, carrying out a detailed survey in the

[1] "Wetter Island" on some maps.

area south of Three Slice Nunatak and attempting to find an alternative route on to the mainland.

In all, journeys totalling nearly 3500 statute miles were made by the Survey's dog-teams during the year and the western shore of the Weddell Sea had been delineated from Hope Bay, in latitude 63° 24′ S., almost as far south as latitude 75° S. Geological and botanical specimens were collected at about fifteen places along this coast and the magnetic variation was observed (but not by the most accurate means) at frequent intervals. The botanical specimens include lichens from 72° 20′ S., mosses from 71° 12′ S. and seaweed from 70° 30′ S.

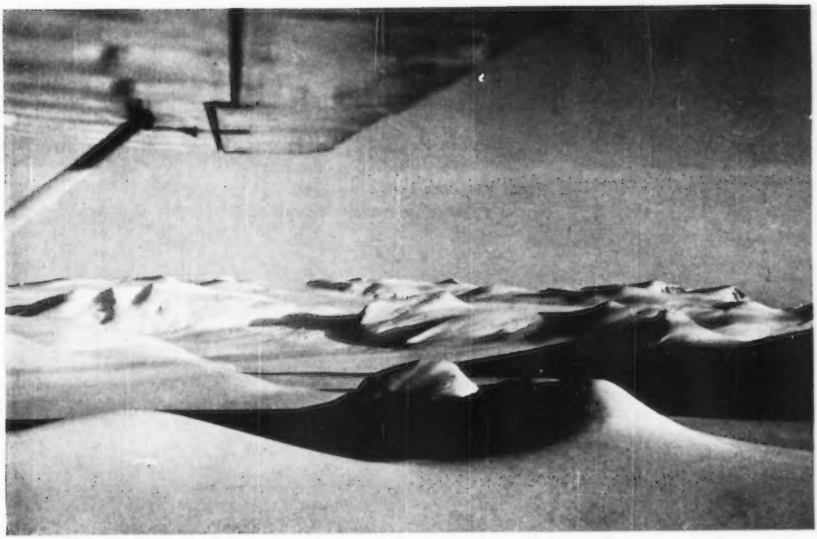
Ice conditions in Marguerite Bay, judging from the experiences of sledging parties, were favourable for an early break-up in 1948 and at the end of the first week in February open water extended to within 5 miles of Stonington Island, with many rotted areas in the sea ice fringing the mainland. But no swell came from the west to break up the remaining sea ice and, when a cold spell set in, the pools of open water froze over again. The Ronne expedition ship, the *Port of Beaumont*, which had been frozen in at a cove near Stonington Island, was unable to move, and attempts to blast a way out were given up when the holes froze over almost as soon as they were made. Fortunately, two American naval icebreakers, the *U.S.S. Burton Island* and *Edisto*, forming "Task Force 39" under Commander G. L. Ketchum, U.S.N., were in the vicinity and, breaking a path to the *Port of Beaumont*, they towed her clear. The *John Biscoe* then relieved and restocked the F.I.D.S. base and was in the open sea again in the early morning of 22 February 1948. The *John Biscoe*, a wooden netlayer with diesel-electric propulsion, built in the United States during the war, had been acquired by the Survey during 1947; she was, in fact, a sister ship of the *Port of Beaumont*.

Sailing north through open pack and brash, she relieved the bases at the Argentine Islands, Port Lockroy and Hope Bay before returning to the Falkland Islands. An engine breakdown prevented her making another trip to the south, on which she was to have taken a light aircraft to Stonington Island to replace the Auster. She arrived back at Southampton in July 1948. On board were some thirty huskies for the French Adélie Land Expedition which was to leave for the Antarctic in October of that year.

The preceding paper was read at the Evening Meeting of the Society on 15 November 1948

DISCUSSION

Before the paper the CHAIRMAN (Mr. E. H. KEELING, M.C., M.P.) said: The lecturer this evening, Captain D. P. Mason, who served with the Royal Engineers during the war, was surveyor in 1946–48 with the Falkland Islands Dependencies Survey organized and controlled by the Colonial Office. During the Antarctic summer of 1947–48 the American Geographical Society also had an expedition in the same region, led by Commander Finn Ronne, and by a happy arrangement a combined American and British sledging party, with Captain Mason, surveyed the Weddell Se oast of Graham Land, much of



Head of east-flowing glacier (68° 15′ S.)

Five thousand foot escarpment, east coast of Graham Land

which was previously uncharted and untravelled by land. The dangers of Antarctic travel are sadly emphasized by the announcement in *The Times* of November 5 that another surveyor with this expedition, Mr. Eric Platt, working from another base, had died of exposure and heart failure. The work of the combined British and American sledging party, who made a remarkable journey of some 1200 miles, will be the main subject of Captain Mason's talk, but he will also include a general account of the Expedition's activities last season.

Captain Mason then read his paper

The CHAIRMAN: As I mentioned earlier, the expedition of which you have heard an account was under the direction of the Colonial Office. The Secretary of State, Mr. Creech Jones, would have been with us to-night if he had not been in West Africa. He has however written a letter to the President of the Society in which he says: "If, when the evening comes, you can find the opportunity to express my regret to those present that I am not with them, I shall be very grateful. I should like you to add if you would that the work of the Falkland Islands Dependencies Expedition has always appealed to me as pioneering of the most intrepid sort. The work done is of considerable importance to us and I have been most grateful to them for the splendid way in which they have carried it out." Ladies and gentlemen, as you paid for the expedition as taxpayers, I hope you feel from those words and also from what you have heard and seen to-night that you are getting good value for your money.

We have with us the Rev. Launcelot Fleming, Dean of Trinity Hall and Director of the Scott Polar Research Institute, Cambridge. Perhaps he will say a few words.

The Reverend W. L. S. FLEMING: I have been surprised by the large number of people, including some who follow Polar exploration with great interest, who have asked recently when there is going to be another British Expedition to the Antarctic. Captain Mason has provided an answer to that question. I should like to congratulate him, his leader Mr. Butler, and the other members of the Survey on the first-class work they did in Graham Land. The pictures we have seen were all taken, naturally enough, on days of sunshine, but I imagine the slide showing the dogs, sitting with their backs to the wind and drifting snow, gives a much truer picture of the normal sledging conditions.

There are two notable facts about this Survey. In the first place, I believe it to be the only occasion in which it has been possible for survey and other scientific work to be carried out in the Antarctic on a long-term programme. The Survey has been working since 1943, and the lecture this evening adds another chapter to the story. While congratulating Mr. Butler and those who were with him, one should realize that the foundation of their achievements was laid by their predecessors. At the present moment the programme is being continued under Dr. Fuchs, and we may look forward to hearing from him the results added from this year's work.

In the second place, the two long journeys down the eastern coast of Graham Land, which Mr. Mason has just described, will take their place among the great polar sledge journeys. Those who have travelled in the Arctic and Antarctic will especially wish to pay tribute to the way in which these sledgers accomplished their task. Captain Mason said they had learned many lessons; they have certainly made good use of past experience and have added a first-class contribution of their own to the technique of Polar travel. On that they are to be congratulated most highly.

While congratulating the party on what they have done and Captain Mason

on the way in which he has described the past year's work of the Survey and on the photographs he has shown us, it is good to know that this is all a promise of things to come. I hope the Survey will be given every opportunity to continue its work and to carry out research in the many fascinating scientific problems which arise in that part of the Antarctic: in geology and biology, in meteorology and glaciology, and in the physical sciences.

In conclusion, I would like to say how much I have enjoyed the lecture as, I feel sure, all who are here this evening will have done.

The CHAIRMAN: And now we should like to hear from Mr. Wordie, Foreign Secretary to the Society and Chairman of the Falkland Islands Dependencies Scientific Committee.

Mr. J. M. WORDIE: I would like to join with Mr. Fleming in congratulating Captain Mason on his splendid achievement. His long sledge journey is comparable with some of the great journeys in the past. The dogs must have been in first rate condition and maintaining a high rate of travel. This journey represents the culmination of nearly four years' work in the Dependencies and there is little doubt that Commander Bingham laid the foundation of last season's successful sledge journey by his careful selection among the dogs and his well-known ability in training dog teams.

The next step is to extend the work still further, and one is glad to know that the new leader who has succeeded Major Butler is Dr. Fuchs, the well-known East African geologist, who will we hope succeed in working out the geological structure as the next stage in the survey.

As Captain Mason was speaking many ideas were started in my mind. One I particularly mention is whether the leading sledge dog is able to steer a compass course with more accuracy than human beings. I wonder if Captain Mason can follow that up and let us know whether, if you place a sledge dog heading in a particular direction, the dog follows that course indefinitely, or whether it is partly due to the man who runs behind and helps to make the course. Is the dog as reliable as the compass?

The CHAIRMAN: I have never been in the Antarctic and, frankly, I never want to go there! That fact disqualifies me from making any comment on the lecture except that of great appreciation. It was stated in the House of Commons this afternoon that the Argentine Government have issued a postage stamp which shows the Falkland Islands and their Dependencies as Argentine territory. Although, of course, we reject that claim, I am sure we should welcome any cooperation by Argentinian scientists in the splendid work which, as we have learned this evening, has been done by British and American scientists. You will, I am sure, join me in thanking Captain Mason for his most interesting lecture and for his magnificent photographs, and in wishing him the very best of luck both in his undergraduate and his post-graduate career.

APPENDIX

Camp routine and sledging methods

The man and dog rations used by the Falkland Islands Dependencies Survey were based on those used by the British Graham Land Expedition in 1934–37. The daily man ration was:

	oz.
Pemmican (Bovril)	5·6
Butter	5·6
Sugar	3·2
Oatmeal	2·4
Chocolate	2·4
Biscuit	2·7
Pea flour	1·6
Milk powder	1·6
Cocoa	0·6
Total	25·7 *oz.*

The rations were made up in plywood boxes designed to fit across the width of the sledges; each box containing rations for two men for ten days, and weighing when packed approximately 45 lb. This daily ration supplied approximately 4000 calories and was found adequate in normal sledging conditions, although we experienced the feeling of physical emptiness usual with sledging rations of small bulk. The ration was supplemented with dried onion flakes, bacon, mashed potato powder, tea and additional cocoa to add variety to the monotonous daily menu. Concentrated orange juice, to provide vitamin C, was taken as a lunch time drink.

The dog pemmican (prepared by Bovril Ltd.) was in 1 lb. blocks, each providing a ration for one dog for one day; forty-eight blocks were packed in a tin inside a plywood box, which fitted across the width of the sledge. At Stonington Island in 1946–47, the pemmican was removed from the tins and repacked in the boxes; at Hope Bay, the boxes were often discarded, and the pemmican carried in the tins. The latter method had the disadvantage that the load is more prone to slip: and the sharp edges of the tins are apt to cut tents, clothing and lashings unless great care is taken. For the long southern journey from Stonington Island the dog ration was increased to $1\frac{1}{4}$ lb. per day and, to offset the increased load, it was carried in special canvas tanks, each holding 350–400 lb. These were less rigid than a boxed load, and on rough going the pemmican was more likely to disintegrate; but on the shelf ice they proved ideal. A large number of the 1 lb. blocks had been sawn almost in half before leaving and could easily be broken in the field; the dogs were fed 1 lb. and $1\frac{1}{2}$ lb. on alternate days. With this increased ration, supplemented at intervals by fresh seal meat, the dogs were satisfied and loose dogs did not attempt to rip the tanks to get more food. For the airborne depots, the pemmican was made up into 75 lb. bales, firmly sewn up in sacking. The loss of an empty sledge tank during a gale made it necessary to carry some of the pemmican in the bales; but provided the original baling had been done tightly, this proved a very satisfactory method.

The Stonington Island party reaped the advantage during the 1946–47 season of Commander Bingham's long experience and great knowledge of dog-driving. The teams, which had to be made up of individuals as no family

groups of dogs were available, were trained under his supervision and driven on the "modified fan" method.[1] During 1947–48, pups reared at the base were added to make them up to nine-dog teams. Centre-trace methods of dog-driving were tried, but all drivers except one reverted to the "modified fan," even for the excellent shelf ice going. At Hope Bay, many excellent pups were reared and experience in dog-driving was gained by experiment, for there was nobody with much previous experience at that base. Rough sea ice sledging was rarely done there and conditions generally favoured the centre-trace. At Stonington Island, only one dog was lost down a crevasse; the team was on centre-trace and a dog, breaking through a snow-bridge, pulled three others down. One of them bit through her harness and fell before they could be hauled up.

On the southern journey from Stonington Island we generally travelled between the hours of 6 a.m. and 2 p.m. (local time) until 20 November 1947 when, in latitude 72° S., the sun was above the horizon for twenty-four hours a day. A change was then made to night travelling, the day's march starting at about midnight and continuing until about 8 a.m. This was to take advantage of the harder and better surfaces when the sun was low. In January the dogs generally sank deep and floundered in soft surfaces after 8 a.m. After the end of December, the dogs' pads began to show signs of wear on the icy crust which formed at night, and we had to make canvas boots for some; but all reached home safely and recovered after a few days' rest.

The normal routine was to set the alarm clock for two hours before the scheduled start; in each tent the cook for the day then made breakfast, of oat-meal porridge and tea or cocoa (generally partially prepared the night before) and packed up inside the tent, while his companion packed up outside and loaded the sledge. The dogs, except the inveterate chewers, were left harnessed all the time, which saved valuable minutes. On the march, fifty minutes' travelling was followed by ten minutes' rest, when the surveyor would take his bearings and make notes and sketches. After four hours' travelling, a lunch halt was made, for about half an hour—or less in bad weather. Lunch generally consisted of biscuits, a knob of pemmican and orangeade from a thermos flask. The total time spent in travelling each day depended on the conditions and loads; during the early stages, to conserve the dogs' strength, we only did six hours a day. Even with full loads, 15 miles (which we considered the necessary mileage if our object was to be attained) was often covered in that time. Later, and with lighter loads, longer hours were the rule, but never more than nine hours' travelling in one day. On our best day, January 6, we did 31·5 miles in eight hours.

At the end of a day's run, the dogs were first tethered out and then fed, and the tents put up. One man from each tent—the cook for the day—got inside, laid out sleeping bags and prepared the supper pemmican, while his partner secured the tent, cleared up, tethered the sledges in case of a gale during the night and placed all loose things together near the tent, so that they would not be lost in a snowfall. Once a week wireless contact was made with base at 8 a.m. to report progress (in an emergency the base's normal schedules could be broken into). The surveyor took a morning sun sight, when necessary, immediately after halting for the day and did a noon sight and other work after the meal. With this routine one got eight hours' sleep a day. Night travelling was continued until we got back to base on January 21, although the midnight sun was last seen on January 5.

[1] See E. W. Bingham, "Sledging and sledge dogs," *Polar Record* 3 (1941) 367–86.

The Hope Bay party followed very much the same routine on their journey to Stonington Island but, as they had no portable wireless transmitter, the cranking of the generator was one task which did not worry them. They had more "survey days" and their travelling hours were longer owing to inferior surfaces. Being farther north, they were unable to take as much advantage of night travelling as the southern party.

On the southern journey the dogs were driven for over 95 per cent. of the time without a man in front to lead them—a tribute to Commander Bingham's training. On the return journey they were only led once; on the steep climb from the shelf ice to the summit of the plateau. The leading team was generally kept on course by means of the P.10 aircraft compass on the leading sledge, and in foggy weather could be driven on a better course than a man ahead could keep, even with a hand compass. The Hope Bay party's dogs were generally led, owing to lack of experience in driving and training.

Survey

Survey methods closely followed those used by Stephenson on the British Graham Land Expedition. Sledge wheel and compass traverses were run between points whose positions were determined astronomically; these control points were established as far as possible at intervals of 40 to 50 miles. The theodolite used by the Stonington Island parties was a standard Tavistock $3\frac{1}{2}$-inch instrument; around base we used the standard tripod, but to save weight on sledge journeys a light photographic tripod was adapted to take the theodolite. This tripod was also suitable for a camera or light plane table. At many of the control points azimuths and rounds of angles were taken to fix major detail; minor detail was added by means of compass bearings and plane table intersections from intermediate traverse stations. Many photographic panoramas were taken with Leica cameras, and they have proved invaluable for adding topographic detail. Heights were by theodolite angles or by Indian clinometer.

The party from Hope Bay used a Wild theodolite (Model T.2); their survey methods were similar except that much greater use was made of the plane table. They were unable to obtain any accurate altitudes for the surface of the shelf ice in the area covered by their journey.

The map sheets which are now being produced by the Directorate of Colonial Surveys are the result of these surveys. Before the work began, the east coast between Hope Bay and 68° S. had been surveyed, from the ground, only as far as Borchgrevink Nunatak (66° 03′ S.), and that survey was known by Nordenskjöld to be unreliable; the remainder was known only from Wilkins' flight in December 1928. A ground survey, supplemented by air photographs, had been made by the United States Antarctic Service in 1940–41 from 68° S. to 71° 50′ S.; from here to 74° 40′ S., the American maps and charts depended on a flight made by the same expedition in December 1940, when the coast had been sketched as far as what was considered to be 77° S. The whole of Trinity Peninsula has now been surveyed, most of it in considerable detail, as far as Cape Longing on the east coast and Cape Kater on the west; the survey of the island system in Crown Prince Gustav Channel and around James Ross Island has been completed. The east coast has now in fact been surveyed from the northern tip of the peninsula to 75° S., although in some places the survey is rather weak, where bad visibility or lack of time has not allowed a full examination of the area (usually at the heads of long inlets). Place names on the east coast, south of Three Slice Nunatak, are provisional and are marked with an asterisk on the map accompanying this paper.

The shelf ice

Both the main journeys were made over the shelf ice on the east coast of Graham Land. Shelf ice is built up by the accumulations of *firn* and *névé*, either on bay ice or on the seaward extensions of land glaciers, but is essentially nourished by precipitation. If sea ice persists for a number of seasons, it becomes bay ice and finally shelf ice, but it is not possible to detect the point of transition from one stage to another. Undoubtedly, some of the ice over which the joint F.I.D.S.-R.A.R.E. party travelled might well be termed "bay ice" or even "sea ice," for it was at times only a few feet thick, yet within a very short distance the surface would rise to 100 feet or so above sea-level. The general term "shelf ice" has therefore been used throughout this paper. There were no signs of very recent changes affecting large areas.

North of latitude 69° 47′ S., probably as far as 65° S. the absence of a tide crack at the junction of the shelf ice and land or land ice indicates that the landward side of the shelf ice is aground. South of 69° 47′ S., much of the shelf ice is afloat, as is shown by the existence of a tide crack along the coast. The height of the surface of the shelf ice south of 69° 47′ was determined at many points by direct comparison with nearby open water cracks; but north of this latitude the height could not be accurately found. A comparison of the heights above shelf ice level of certain points on the plateau with their heights by barometric observation in 1946–47, indicates that the surface of the shelf ice about 5 miles from the coast in latitude 67° S. is 300–400 feet above sea-level; but this estimate may be subject to considerable error.

ROMAN TRIPOLITANIA: RECONNAISSANCE IN THE DESERT FRONTIER ZONE

R. G. GOODCHILD

IN THE YEARS 1946–49 during the greater part of which period I had the privilege of serving as Antiquities Officer with the British Military Administrations in Libya, I visited a considerable number of ancient sites in the central sector of the frontier zone (*limes*) of Tripolitania between the Gebel escarpment and the line of the Wadi Zemzem. The *limes Tripolitanus* was the easternmost of a series of frontier zones protecting the Roman provinces of Africa. It ran for some 1000 kilometres from Turris Tamelleni (the modern Telmine, on the edge of the Chott el Djerid) to its eastern terminus at Arae Philaenorum (Muktar, near "Marble Arch"), on the borders of ancient Cyrenaica. Of this total length, the eastern 300 kilometres from the great salt-march of Sebcha Tauorga to Arae Philaenorum, have still to be explored. Most important however, historically and geographically, is the central sector between the Tunisian frontier and Sebcha Tauorga. This protected the prosperous coastal cities of Sabratha, Oea and Lepcis against the Numidian tribes of the interior and, at the same time, embraced an area of great agricultural importance, the olive-bearing zone of the Tripolitanian Gebel.

Previous exploration

The archaeology of the interior of northern Tripolitania has not received, during the last half-century, the attention that it clearly merits. This is the more surprising when one recalls how many of the great African explorers of the early nineteenth century found time to examine and record the ancient remains which they met with on their way to the Fezzan and Central Africa. Commander (later Rear-Admiral) W. H. Smyth was the first European to penetrate deep into the Roman frontier zone. He visited the important remains at Ghirza in the Wadi Zemzem; and although his journey, made in 1817, seemed to him a disappointment, that was largely because of his failure to appreciate the significance of what he saw there.[1] Seven years later Major Dixon Denham, returning from the Fezzan, visited the same site and made important records of the Roman reliefs and inscriptions. It was in 1818 that Captain G. F. Lyon, on his way to Murzuch, discovered the Roman fortress at Bu Ngem, and made a drawing of one of its gateways, subsequently demolished by the Turks to provide materials for a fort of their own. Unfortunately the great expedition of the Beechey brothers in 1821–22, from Tripoli to Cyrenaica, did not pass through the Tripolitanian hinterland, but many small defensive towers, of a type characteristic of the Roman frontiers in

[1] Smyth (whose description of Ghirza is contained in F. W. and H. W. Beechey, 'Northern Coast of Africa,' London, 1828, pp. 504–512) dismissed the whole residential quarter of ancient Ghirza as "some ill-constructed houses of comparatively modern date."

Libya, were seen by these travellers along the shores of the Syrtis, and carefully described in their Report.[1]

In 1851 the German explorer Barth, travelling to Lake Chad on behalf of the British government, encountered in the Tripolitanian Gebel and between Mizda and Tabunia various Roman structures which he has described. It was this same explorer who illustrated the Roman mausoleum at Germa, the southernmost monument of Romano-Libyan architecture in Africa. Rohlfs, bound for Kufra ten years later, noted numerous ancient watchtowers in the Orfella region of inner Tripolitania, and justly remarked that many of them were of early Islamic date.[2]

The contribution of these early travellers to our archaeological knowledge of the Tripolitanian *limes* was a very substantial one. But they were all intent on reaching distant destinations, and could spare little time to examine in detail the zones through which they passed. Not until 1895–6, when H. S. Cowper made an admirable archaeological survey of the Tarhuna plateau, was any part of the hinterland studied as a region; and it was only in 1901–4 that an attempt was made, by the French explorer Mehier de Mathuisieulx, to follow all the main routes of northern Tripolitania and obtain a general picture of the geography, geology, and archaeology of the whole territory.[3]

As had been expected, the years of Italian occupation (1911–42) opened up the interior of Tripolitania to widespread European penetration, and to the exploratory activities of this period we owe most of what we know of the geography of the area. Italian officials and soldiers stationed in remote outposts often took a deep interest in local topography and history, as is shown by two useful monographs on the Ghibla and Orfella regions.[4] The existing cartography of Tripolitania is based almost entirely on Italian work (see Appendix). Archaeological research, too, was particularly intense in pre-war Tripolitania, but it was mainly concentrated in the coastal regions; and although Professors R. Bartoccini and G. Caputo carried out important excavations in the areas of Asabaa and Tarhuna respectively, the *limes* area south of the Gebel never came fully within the orbit of Italian archaeological activity. This was because, in the first place, the colonial antiquities service, understaffed in trained archaeologists, had major excavations in progress on the coastal sites, and could not take on new commitments; and secondly because the scientific missions which arrived from Italy after 1930 were not unnaturally eager to get to grips with the then newly-conquered

[1] G. F. Lyon, 'Travels in Northern Africa in the years 1818–20,' London, 1821, pp. 65–7; D. Denham and H. Clapperton, 'Travels and Discoveries in Northern and Central Africa,' London, 1826, pp. 305–309; F. W. and H. W. Beechey, *op. cit. passim.*

[2] H. Barth, 'Travels and Discoveries in North and Central Africa in 1849–55, London, 1857, Vol. I, *passim.* G. Rohlfs, 'Kufra.'

[3] H. S. Cowper, 'The Hill of the Graces,' London, 1897—an excellent work marred only by the false conclusions as to the date and purpose of the "senam" monuments. M. de Mathuisieulx, *Nouvelles Archives des Missions scientifiques*, 10 (1902) 246–77; 12 (1904) 1–80; and 13 (1906) 73–102.

[4] A. Belardinelli, 'La Ghibla,' Tripoli, 1935; G. Bauer, "Notizie sulla regione di Orfella," *Bollettino Geografico* (Ufficio Studi, Governo di Tripolitania) 3 (1932) 33–51.

Fezzan.[1] The *limes* area, north of the Wadi Zemzem, remained as it had been throughout the nineteenth century, eclipsed by the greater fascination of the regions further to the south. Historians concerned with the problem of Rome's desert frontier could only draw on the important, but often misleading, reports written by de Mathuisieulx. The erroneous conception of the *limes Tripolitanus* as a linear frontier drawn along the crest of the Gebel, and not—as we now know it to be—a deep defensive zone, largely springs from this source.

The archaeological remains

The archaeology of inner Tripolitania, which is, monumentally, almost exclusively Romano-Libyan, is closely linked with its geography. As one goes inland, one leaves behind the purely Mediterranean civilization of the Roman cities on the coast, and enters a zone where Mediterranean and Saharan elements are mixed. It is significant that the city—the most characteristic feature of the Roman Empire—is entirely absent in the interior of Tripolitania, and that the only known Roman villages are those which sprang up along the Roman road which passed along the crest of the Gebel. We have identified two of these villages during the last three years, one at Ain Wif (the ancient Thenadassa) which Mr. Ward Perkins and the writer examined in 1948, the other at Medina Doga (the ancient Mesphe) identified by the writer in 1947 and surveyed last summer.[2] The survey of the latter site was greatly facilitated by the geometrical precision with which Italian farmers have planted a "grid" of olive-trees, 20 metres apart, on top of the ancient ruins. It is not often that the field archaeologist finds his site already "pegged out" in this manner!

Apart from these two sites, and others still to be identified on the same Roman road, the archaeological remains of the interior are normally Roman farmhouses, standing either alone or in groups of two or more,[3] the mausolea which very frequently accompany these farms, and the extensive series of terrace-walls which occupy many of the wadi-beds. Roman dams are occasionally found in the Gebel region (as, for example, the remarkable—and still unexplained—series in the Wadi Dauùn near Tarhuna), but further to the south the remains of hydraulic installations suggest that the aim was not so much to impound rain water in open reservoirs (the high rate of evaporation would have made this a profitless task) as to stem its flow by means of catchment barriers, and to divert it either into covered cisterns or, by means of irrigation channels, over the surface of cultivated ground.

[1] Reference must be made to Professor Caputo's important archæological discoveries in the Fezzan, described in the Italian Royal Geographical Society's publication 'Il Sahara Italiano—Fezzan e Oasi di Gat,' Rome, 1937, pp. 303–330. These revealed a native society, probably the ancient Garamantes, using Roman pottery but otherwise completely unromanized (*cf. Annali Istituti Orientali di Napoli*, 3 (1949) 11–33).

[2] The ruins at Medina Doga (Medina or Ragda) were first reported by W. H. Smyth in 1817 (Smyth, 'The Mediterranean,' p. 486), but Cowper failed to find them ('Hill of the Graces,' p. 241) and they were subsequently forgotten. The Roman Gebel road passes through the centre of the site.

[3] Ghirza, the 'city in the desert,' is in fact a particularly large group of self-contained fortified farms (*cf.* D. E. L. Haynes, 'Ancient Tripolitania,' 1946, pp. 104–5.

The plain of the Gefara, singularly destitute of ancient remains, marks a broad barrier between the coastal and interior cultures of the Roman period; and it is only in the region of Lepcis Magna, where the Gebel meets the sea, that the transition is sudden. The Gebel itself—and by the term Gebel is normally meant the fertile northern edge of the Tripolitanian plateau—was, in ancient times, the main olive-growing region of Tripolitania. As early as the middle of the first century B.C., the inhabitants of Lepcis Magna were able to draw on the produce of hundreds of thousands of olive-trees, and the planted areas probably increased during the Roman period. Throughout the Gebel area the traveller encounters the massive uprights of Roman olive-presses, at one time suspected as being "megalithic" monuments of pre-historic origin. In a fortified olive-farm at Msufiin, near Garian, the writer excavated last summer numerous fragments of Christian inscriptions of the fourth century A.D., in which the "opulence," "abundance," and "prosperity" of God were praised, a reflection no doubt on the general economic prosperity of the countryside during that period.

A comparison between the olive plantations of the Roman period, and the Italian plantations of to-day springs readily—perhaps too readily—to mind. Examination of these two periods of agricultural development reveals more points of contrast than of comparison. In the first place, the development of the Gebel in the Roman period was the result, not of any sudden phase of "colonization", but of many years of gradual plantation. Secondly, the Roman olive-farms were occupied in the main by more or less romanized members of the indigenous population, and not by immigrant settlers. Third, and most important of all, the archaeological evidence leaves little doubt that the ancient olive-farms were scattered, almost haphazard, over the country-side and not laid out mathematically, in chess-board design, oblivious of contours and natural obstacles. To obtain a visual impression of the Gebel countryside in Roman times, it is better to leave the areas of recent colonization, and to study instead the surviving zones of indigenous plantation at Cussabat or Garian. Our air photograph of the hill-top village of Msufiin, near Garian, shows clearly the careful terracing of the hillsides carried out not merely to increase the cultivable area, but to protect the adjacent olives from the ever-present danger of soil-erosion. Undoubtedly the olive trees were denser in the Roman period, but the general pattern of land-use was much the same. The mound of Henscir Taglissi, in which were found the Christian inscriptions previously referred to, lies in the centre of the photograph.

Our recent researches have however been concerned both with the military and the economic aspects of Roman settlement in this frontier zone. An earlier generation of archaeologists believed that a series of large Roman forts ran along the crest of the Gebel, forming a linear frontier. We found no confirmatory evidence of any such defensive system. On the contrary, the normal unit of defence in the Gebel—as in the area further to the south—seems to have been the fortified farm, a tower-like structure originally two or three storeys high, and usually surrounded by a broad ditch. These buildings must have resembled the signal-towers shown on Trajan's column and often discovered in the frontier regions of Britain and Germany; but their function

Pre-desert landscape with surviving vegetation, Wadi Beni Ulid

Gebel landscape Msufiin, near Garian

Roman fortified farm in a now desert area

Roman fortified farm on Tarhuna Gebel

was more comprehensive, for they were clearly the homes of the farmers who cultivated the surrounding countryside. Inscriptions testify that these towers, which often have olive-presses built into, or adjoining them, were classed as *centenaria*, and their owners were in many cases *centenarii*, a *centenarius* being the territorial army rank equivalent to the centurion of the Roman regular army.

The southern limits of the main area of ancient olive cultivation can be determined with some accuracy by the distribution of Roman olive-presses,

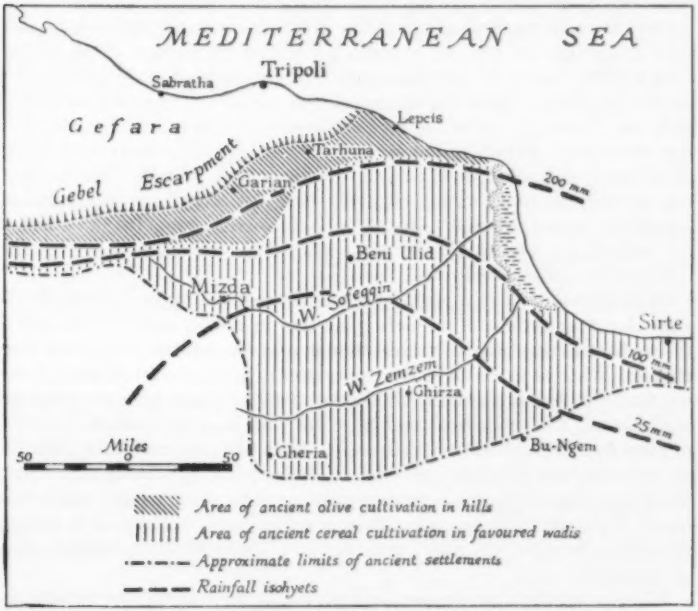


Figure 1

and these limits coincide almost exactly with the edge of the "high plain" climatic zone, and the beginning of the "steppe." The present rainfall isohyet of this line of demarcation is approximately 200 millimetres per annum. South of this line the rainfall diminishes rapidly, Beni Ulid enjoying a modest 60–70 millimetres, and Mizda often suffering several successive years with no rainfall at all.[1] Yet the steppe and desert areas south of the Gebel were, in the Roman period, capable of supporting a considerable sedentary population, as is shown by the extensive remains of fortified farmhouses as far south as the Wadi Zemzem. This was probably due, partly to a slightly higher rainfall

[1] H. Vischer ('Across the Sahara,' London, 1910, p. 63) records that at the time of his arrival at Mizda in 1906, it had not rained there for twelve years. Rainfall must always have been low in this part of the Sofeggin, for there are no traces of ancient cultivation in its bed.

during the Roman period, but mainly to the existence of numerous wadis running south-eastwards from the Gebel watershed, the beds of which retained sufficient moisture to make possible the cultivation of cereals, dates and even vines. After exceptionally heavy rainfall some of the more favoured wadis, such as the Wadi Beni Ulid, are flooded even to-day; but it would be rash to assume that such winter flooding was normal during the Roman period, and that it was the basis of the agricultural system.[1] The region south of the Gebel must always have been a marginal one, and its successful agricultural exploitation was largely due to the skilful way in which the Romano-Libyan farmers terraced the beds of the wadis, and built catchment walls along their sides to prevent the rain-water which poured off the surface of the plateau from washing away the precious soil. These catchment walls consist of a double line of flat stones, the intermediate space having originally been filled with clay: the stones broke the force of the winter torrents, the clay prevented the water from seeping through the barriers. Nowadays however the clay filling has largely disappeared and the double lines of flat stones give the misleading impression of having formerly been aqueducts—an interpretation completely refuted by their levels. The terrace-walls, across the full width of the wadi-beds, were dry-built of rough stones: they have survived the centuries remarkably well.

In this southern desert region the Roman fortified farms have much the same character as those of the Gebel; but they invariably stand on the sides of the wadis, and their state of preservation is very much better, due to the drier climate. Whereas in the Gebel the upper storeys have usually collapsed, forming flat-topped mounds, in the Ghibla and Orfella regions these structures are still standing two or three storeys high and even have the butt-ends of their original floor-beams visible in their walls. Their plans are essentially Saharan: the outer walls are pierced only by a single doorway, light being admitted to the living rooms from the open courtyard, or light shaft, around which they stand. To students of provincial Roman archaeology, accustomed to a sharp distinction between the "villa" and the "fort," these African structures come as a surprise.

More impressive than the simple, if robust, fortified farms, are the funerary monuments which almost invariably accompany them. These are built of finely-cut ashlar throughout, and have in many cases a wealth of ornamental detail in characteristic Romano-Libyan style, of the type which so disgusted W. H. Smyth in 1817. That traveller, a great geographer but a disappointing archaeologist, described the tombs of Ghirza as "of a mixed style and in very indifferent taste, ornamented with ill-proportioned columns and clumsy capitals . . . loaded with absurd representations of warriors, hunters, camels, horses and other animals." He thought that this site might be the origin of the legend of Ras Sem, the "petrified city" of the Libyan desert, and lamented the fact that the propagators of this fable should be "so glaringly deficient in the discernment bestowed by education." [2]

[1] It is difficult to ascertain how often the Wadi Beni Ulid floods. Bauer (*op. cit.*, p. 40) cites only the years 1914, 1925, and 1932; but in 1819 Lyon (*op. cit.*, p. 61) remarked on the frequency of such floodings.

[2] Quoted by the Beechey brothers, *loc. cit.* The fabulous Ras Sem has more recently

Phot. M. H. de Lisle

Roman olive presses at Snemat, Wadi Merdun

Courtesy Antiquities Dept. Tripolitania

Romano-Libyan funerary monuments at Mselletin, Wadi Merdun

Reapers on a relief from Ghirza

Courtesy Antiquities Dept. Tripolitania

Romano–Libyan mausolea at Ghirza

Italian soldiers viewed the ruins of Ghirza with very different emotions. To them these funerary monuments seemed to represent an oasis of Italic culture in the heart of a barren and inhospitable land. One officer wrote, after his first glimpse of Ghirza, "one sees . . . these age-old monuments, majestic and full of grace in their delicate colonnades, contrasting indescribably with the surrounding squalor, abandon and loneliness, resisting the ravages of time and remaining to attest the boundless power and greatness of Rome the dominator." [1]

Neither viewpoint does justice to these remarkable monuments, or to the numerous similar ruins, less well known than Ghirza, scattered throughout the Sofeggin and Zemzem basins. The artistic merits or failings of these structures are of relatively minor importance: their interest lies in the fact that they represent a hybrid Romano-Libyan culture which brought prosperity to deserts which previously and subsequently knew no settled human occupation. The "absurd representations" of men and animals are valuable documents of the life of the countryside during the period of its greatest recorded prosperity. From these reliefs and especially from those at Ghirza, we can obtain an impressive picture of the daily life of the people of the frontier zone; horses and camels ploughing the wadis, corn and vines being harvested, date cultivation, hunting scenes and, more rarely, scenes of frontier strife with the desert peoples.

The great agricultural exploitation of the Tripolitanian interior during the Roman period was not in fact, as later colonizers wished to believe, an experiment in European colonization in a backward area. It was rather an attempt at settling an indigenous and semi-nomadic people as static farmers to act as a human barrier against invasion by more dangerous nomads. Inscriptions, whether in Latin or Libyan, show clearly that the occupants of the fortified farms and the constructors of the tombs were Libyans, and probably belonged to the ethnic group known as the *Arzuges* in later Latin literature. The strong influence of Punic on their language suggests that these people came from the stock of those *Libo-phoenices* to whom Strabo refers.

The history of ancient settlement in the interior

Our existing evidence is still inadequate to throw much light on the detailed history of settlement in the *limes* zone of Tripolitania. The only building of "fortified farmhouse" type which can be rigidly dated belongs to the years A.D. 244–6; many others appear to belong rather to the fourth century A.D., and there are a large number which are clearly early Islamic in date.[2] The

been identified by Aurigemma (*Rivista della Colonie Italiane*, 2 (1928) 565–573 and 733–742) as the fossiliferous zone of Maaten Rasim, between Augila and Agedabia, where Professor G. Petrocchi has recently found many remains of Mastodon. Thus the legend of "petrified cities" in Libya arose from two sources; from the Romano–Libyan sculptures of the *limes* zone, and from the fossil remains of extinct mammals at Rasim. Only a year ago the writer was asked by an intelligent Libyan driver whether the statues in the museum at Sabratha were men turned to stone, or "statues like Mussolini used to make." The legend dies hard.

[1] Tenente G. Bacchetti, quoted in Itinerario No. 41 of the *Manuale Itinerario*.

[2] For further details of the historical problems see R. G. Goodchild and J. B. Ward Perkins, "The limes Tripolitanus in the light of recent discoveries," *Journal of Roman Studies*, 39 (1949) 81–95.

main period of settlement south of the Gebel seems indeed to fall within the margins A.D. 200–900, and thus to have continued long after the Roman frontier had ceased to exist. For the earlier period we have information from documentary sources, including that remarkable Roman "Army List," the *Notitia Dignitatum*, which shows how the Tripolitanian frontier was divided up into zones under zone commanders (*praepositi limitis*). For the later period history is almost silent, although Corippus, the epic poet of the Byzantine wars in Libya, gives some interesting, if vague, glimpses of the times when the people of the former frontier zone had become the enemies of the Eastern Roman Empire. How soon after the first Arab invasions the Libyan population of the *limes* zone abandoned Christianity or paganism in favour of Islam is unrecorded, but the continued occupation of Romano-Libyan farmhouses in the early Islamic period, and the conversion of a church into a mosque by the addition of a *mihrab*, alike suggest a gradual and tranquil transition.[1] It was only during the second wave of Arab invasions that settled life, either for the climatic reasons referred to above, or because of insecurity, gradually became impossible in the majority of the wadis and the reduced and impoverished population became nomadic, or settled in centres such as Mizda and Beni Ulid. The Wadi Beni Ulid preserves, even to-day, all the characteristics of the landscape in Roman times. Its terraced and cultivated bed, fringed on either side by the rocky wastes of the plateau, represents the original appearance of those wadis in the *limes* area which are now completely desiccated and abandoned. The unit of human habitation is however no longer the fortified farmhouse; the population, now highly concentrated in this area, occupies a series of small villages clustered along both sides of the wadi. The change from the isolated life of the farm to the communal life of the village must have hastened the process of "arabisation."

General conclusions

The routes followed by the writer during the last three years are marked on the accompanying map together with other routes in the hinterland of Misurata, between Bir Dufan and Sebcha Tauorga, which my colleague Mr. Michael de Lisle examined last summer when I was temporarily incapacitated. It will be evident from the map how many important areas remain to be covered, especially in the western Gebel between Zintan and the Tunisian border, and also between Mizda and the oases of the Gheriat. For these two latter areas we have the records made by Corò and Barth respectively, and it is clear that the archaeological remains are of the general category already described. It seems probable however that the general limits of Roman settlement, as shown on our map, are substantially correct, even if isolated monuments, such as the mausoleum of Germa, lie outside them.

It need hardly be pointed out that many of the conclusions which have been reached as a result of these initial reconnaissances will require supplementing and modifying in the light of future research. In particular, our

[1] The church in question lies in the Wadi Busra, near Beni Ulid, was first discovered by Capt. T. Hillyard in 1946 (in the course of a series of local reconnaissances carried out on behalf of the Antiquities Dept. in Tripolitania) and was examined by Mr. Ward Perkins and the writer in 1948.

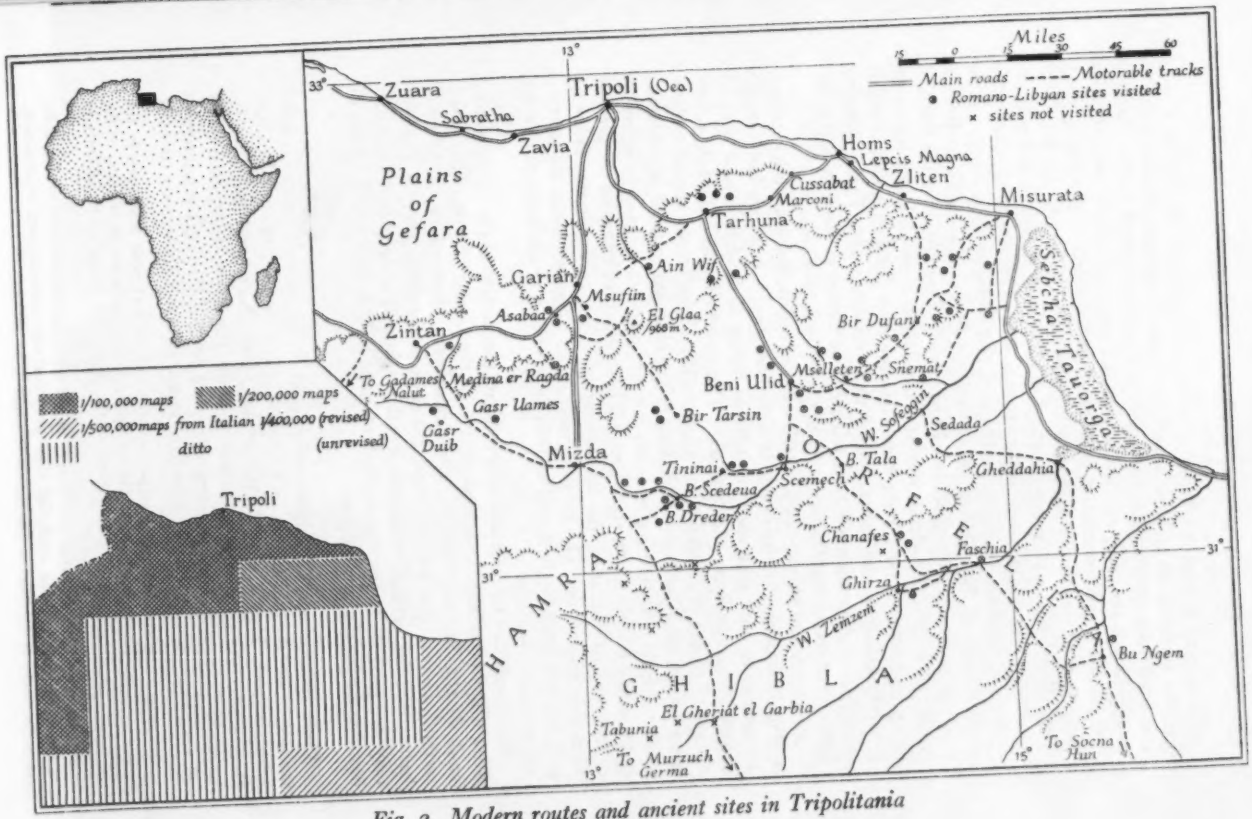


Fig. 2. Modern routes and ancient sites in Tripolitania

chronological deductions, based on a very few inscriptions, and on a comparative study of the architecture of the fortified buildings, require confirmation from more substantial evidence. In this problem one of the best methods of approach is the study of a single area as a geographical and archaeological unit, with a detailed examination of its ancient remains. Work of this type is being carried out in the Cussabat–Marconi area by Mr. E. D. M. Oates, Rome Scholar in archaeology at the British School at Rome, and will undoubtedly have important results. It must be remembered that excavation —the only ultimate arbiter in problems of archaeological chronology—is far more difficult on these African sites than it is, for example, in Great Britain. Huge quantities of fallen rubble will have to be removed from the fortified farms before their floor-levels can be reached; and those buildings which are best preserved and stand highest are often the most dangerous ones in which to work, owing to the inclination of their ruinous walls. Those planning campaigns of excavation will have to bear these factors in mind, as well as the difficulty of recruiting digging gangs in the more remote areas.

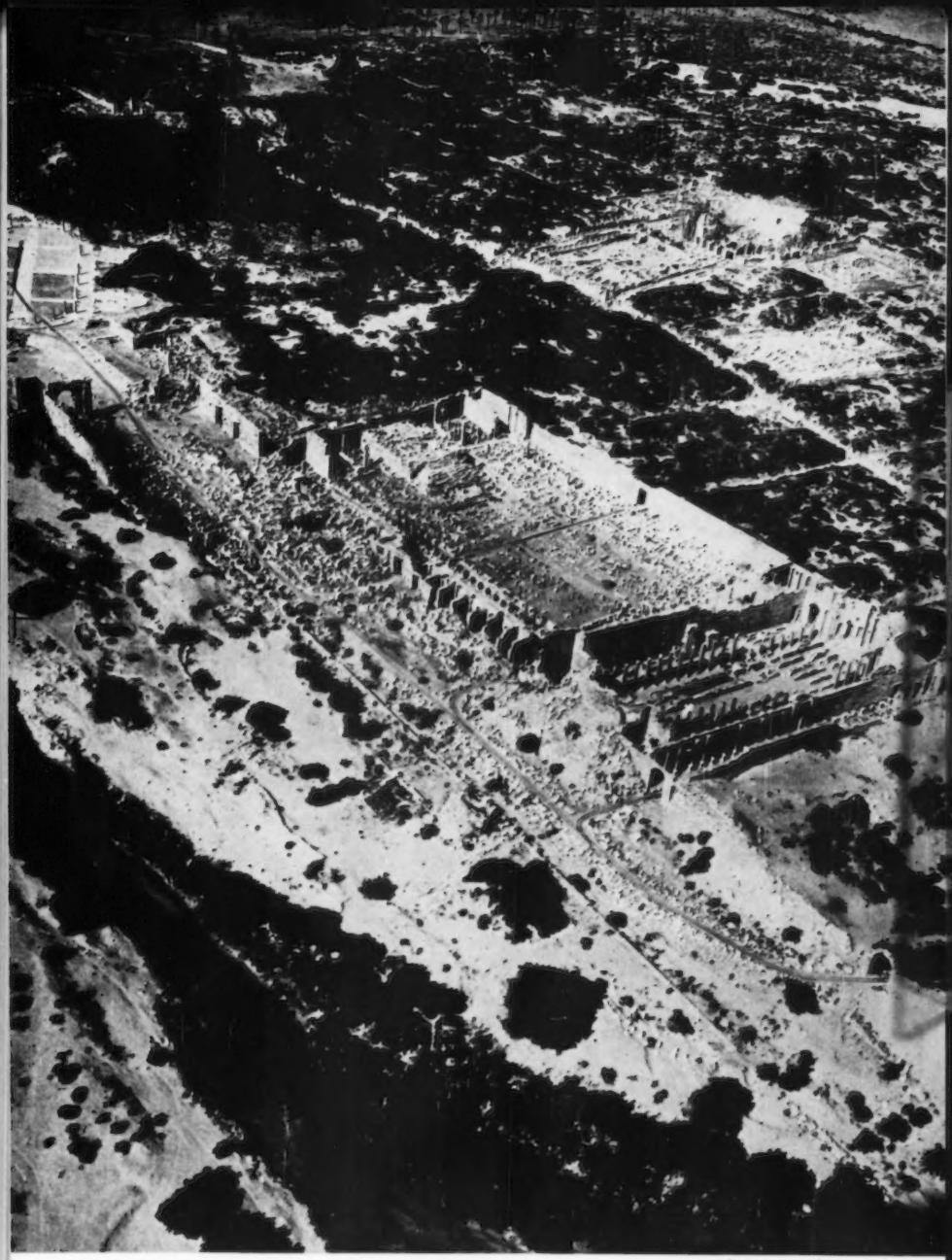
Air survey and photography, which we used for the first time last summer, will undoubtedly have their value in the prosecution of research, but it would be unwise to anticipate such remarkable results as Poidebard and Baradez have obtained in Syria and Numidia. The Roman frontiers of Libya were always of minor importance, and their military installations appear to have been on a correspondingly small scale.[1] Tripolitanian fortified farmhouses, rarely more than 30 metres square, are not so photogenic as the large fortresses of the major frontiers. No signs have yet been observed either on the ground or from the air of those linear *fossata* which are such an important feature of Baradez's discoveries. The greatest value of air photography in the interior of Libya will probably be found to lie in its revelation of extensive cultivation and irrigation systems.

We have not so far been able to investigate that section of the Tripolitanian *limes* which lay along the coastal regions of the Greater Syrtis. The classic work of the Beechey brothers and preliminary observations made more recently suggest that we shall find there, as in the Sofeggin and Zemzem basins, that the fortified farmhouse was the main unit of defence.[2] The same may well prove to be the case in the hinterland of Cyrenaica which I hope to examine during the current year.

These archaeological reconnaissances were made possible by the helpful attitude of the Administration in Tripolitania and, in particular, of its Chief Administrator, Mr. T. R. Blackley, C.B.E., and Chief Secretary, Mr. H. Mercer, M.C., D.F.C., who, in the midst of more urgent problems, have given the greatest encouragement and support to such studies. Among the numerous officers of the Administration who have given assistance at various times, I

[1] In 1949 we discovered and planned a small Roman fort near Mselleten in the Wadi Merdum. Measuring only 22 metres square it was no larger than many of the fortified farms, yet it was an exact replica of the large forts found so abundantly in Numidia.

[2] For the region of the Syrtica there exists an excellent but little-known monograph: L. Cerrata, 'Sirtis,' Avellino, 1928, full of geographical and archaeological information. Systematic study of the *limes* in this region remains to be initiated.



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Ruins of the great Roman coastal city of Lepcis Magna

must particularly mention Lieut.-Colonel P. J. Sandison, Sudan Defence Force (then Deputy Chief Secretary in Tripolitania) and Captain C. C. Tower, Coldstream Guards (then Civil Affairs Officer for the Desert Areas). Doctor Cesare Chiesa, Director of the Museo Libico in Tripoli, accompanied me on many occasions, and to Professor Giacomo Caputo, Superintendent of Monuments in Tripolitania, I am indebted for constant help and advice. The help given by the British armed forces in Tripolitania has been indispensable, and the results obtained during the summer of 1949, when air survey and photography were first applied to this *limes* problem, were largely due to the cooperation both of the First Infantry Division and of the Royal Air Force station at Castel Benito.[1] In concluding these acknowledgments, I need hardly say how great has been my debt to Mr. J. B. Ward Perkins, Director of the British School at Rome, who accompanied me on several tours, and with whom I am collaborating in the publication of some of their results. The post-war revival of archaeological research in Tripolitania has been largely the result of his own inspiration and example.

The preceding paper was read at the Evening Meeting of the Society on 19 December 1949

DISCUSSION

Before the paper the PRESIDENT (Sir HARRY LINDSAY) said: I have much pleasure in introducing Mr. Goodchild who is to talk to us about discoveries in Roman Tripolitania. Mr. Goodchild is Deputy Director of the British School at Rome, but his experience of Tripolitania dates from his work as Antiquities Officer under the British military administration. Since 1946, he has been engaging in archaeological surveys and reconnaissance in the desert frontier zone of Roman Tripolitania and it is about these that Mr. Goodchild will tell us to-night.

May I add that this last summer our Society was able to give some help to Mr. Goodchild in securing R.A.F. assistance for his archaeological survey work in Tripolitania.

Mr. Goodchild then read his paper

The PRESIDENT: We have heard an extraordinarily interesting account from Mr. Goodchild of his explorations in Tripolitania. I should like to ask whether anybody desires to put questions or to join in the discussion. Before going any further I wonder whether Miss Kenyon, Secretary of the Institute of Archaeology, would like to contribute anything?

Miss KATHLEEN KENYON: I am grateful for this opportunity of joining in the discussion on Mr. Goodchild's paper, which I have found most interesting. My own work in North Africa has been of short duration compared with his, and I have been concerned with the other side of the problem of Roman North Africa, that is to say, the coastal cities, where the evidence of Roman life is still visible and recognized all over the area. Mr. Goodchild's important work, on the other

[1] Messrs. M. H. Ballance, R. M. Bradfield, M. de Lisle, and E. D. M. Oates worked with me during various stages of the summer expedition. Captain Lord Leven, Grenadier Guards, and Flight-Lieutenant E. H. O'Toole, R.A.F., together with other serving officers, accompanied our ground party, whilst Group-Captain W. Satchel provided flying facilities which had been authorized by the Air Ministry at the request of the Royal Geographical Society.

hand, has been inland, where the Roman genius for improvization is so strikingly apparent. They showed there their method of organizing the country so as to put it to its best use.

Tripolitania is a curious country in its deserted appearance to-day. It is extremely infertile to European eyes, and yet its reputation in ancient times is in great contrast. The cities of the coast are still evidence of that contrast for they suggest a flourishing province to support three such large cities. There is no doubt that the economic organization of the country under the Romans was infinitely superior to anything that has existed there since; by their methods of water conservation and soil control, they managed to make it a reasonably economic and productive land. This alone enabled them to organize the agriculture of the hinterland, about which Mr. Goodchild has spoken. Again, of course, this deep extension of their venture was for the purpose of controlling that trade with Central Africa which was so very important to them.

The ports on the Tripolitanian coasts are not good. That at Sabratha, for instance, where I was working, was not much more than twice the size of this hall. Nevertheless, the Romans found it worth while to take over these Phoenician sites and to develop them into really fine cities, to provide the ports for the trade in the products of the province and the interior.

The British School at Rome has collected an enormous amount of information about the interior organization of Tripolitania, and I think I would like to emphasize, what perhaps has been obscured by the facility of Mr. Goodchild's lecture, the amount of work which has gone into the collection of this material. We have seen photographs of the monuments which Mr. Goodchild has mentioned, the forts, farmhouses, temples, and churches, which were completely unknown before, and it is almost entirely due to Mr. Goodchild and his collaborators that the information about this ancient organization has come to the knowledge of historians and archaeologists.

It has been no light task to collect this material. It is not so many years ago since the work started, and the work has proceeded in what is not at all a pleasant area in which to work, for it is a terribly hot and exhausting country. Mr. Goodchild has gathered his material and is now making it available to the public. I would emphasize that second point, because there are so many people who do collect extremely interesting material but it is a long time before anybody knows anything about it.

We congratulate Mr. Goodchild on the amount of information he has placed before us and the extremely interesting lecture he has given.

The PRESIDENT: Is Mrs. Brogan here? She has also excavated in Tripolitania; would she like to join in the discussion?

Mrs. BROGAN: I do not know that there is very much that I can say, for I am only a camp-follower of Miss Kenyon and Mr. Goodchild in Tripolitania. I have however one advantage over Miss Kenyon, for I happened to come to Garian last summer, shortly after Mr. Goodchild and his remarkable expedition had passed through. Mr. Goodchild with his collaborators, military and civil, in jeeps and lorries, created quite a stir amongst the local population as they went off to the south along that road to the Garamantes and the country beyond which must be one of the most ancient tracks across the Sahara. You will remember that Herodotus says that ten days' journey from Angila there is a hill of salt, with a spring of water and many palms bearing fruit; and therein dwell men called Garamantes, a very great nation, who bring earth to put on salt and sow seeds therein, and from there to the land of the Lotophagi, which is the nearest place on the coast, is a journey of thirty days. Those lotus eaters are those who dwelt in the coastal cities of Tripolitania.

Mr. Goodchild's exploration of the interior of Tripolitania has shown us the conditions under which that ancient trade across the Sahara was able to function in Roman times. We can see that for quite a long way along the road there were stations, and cultivated areas, so that the caravans coming in could find water and supplies.

It is rather interesting to remember that a hundred years ago, in 1850, Heinrich Barth made his celebrated journey from Tripoli to Lake Chad. He passed through Garian and down to Misda, and, as Mr. Goodchild told us, he drew a picture of that far-off fort at Gheria el-Garbia. Barth records on his map that he left his camp at Tabonia near that fort on April 17 and got to Germa in the Wadi Gherbi, the first station in the Fezzan, sixteen days later, on May 1. Thus you see that a Roman fort stood near the middle point on the thirty days' journey required by the people known to Herodotus to come from their homes in the interior to the coast.[1] At Germa, as Mr. Goodchild remarked, there are Roman remains, and the Italians have, I believe, found Roman objects in the tombs of the Garamantes which they have investigated. In fact, archaeologists seem to be closing in on the Sahara. We have heard about Mr. Goodchild's work to-night; in the Anglo-Egyptian Sudan there are zealous archaeologists and there is now an Antiquities Department in Nigeria. We cannot pass the Sahara through a sieve, but with all these people on the watch we may hope gradually to discover more about the ancient Roman trade which was carried along its tracks. I hope that Mr. Goodchild as he moves eastward into Cyrenaica is going to find yet other ancient gateways to the desert.

Mr. L. P. KIRWAN: I would like to raise two or three general points about Mr. Goodchild's excellent paper. The first is to stress the value of archaeological surveys of this kind, not only from the point of view of historical geography but from an archaeological point of view in that at small cost, much less than that of excavation work, they often produce much valuable history. The second point is the special interest Mr. Goodchild's work has for this Society and for geographers. At, I think, the International Geographical Congress at Cambridge in 1928, a project for a map of the Roman world was launched. Many meetings of the Commission were held at this Society and, stimulated greatly by the activities of Mr. O. G. S. Crawford, many sheets were produced. Mr. Goodchild's discoveries in Tripolitania, and later we hope in Cyrenaica, are to go on a projected 1 : 1,000,000 map of Roman Libya. My third point is the special interest and convenience that Tripolitania and Cyrenaica possess, not only for the archaeologist, but for the geographer and especially for geographical expeditions from the Universities. Both offer wide opportunities for geographical work of many kinds; and for work on water resources and land settlement of practical value to present and future Libyan administrations. The territories are moreover reasonably accessible, and the inhabitants and the administration sympathetic; this is specially valuable to-day when so many parts of the Near and Middle East are difficult to work in, for nationalist and political reasons.

A MEMBER: Could the lecturer give us any indication of the relative rainfall in, say, the third century A.D. and at the present day?

Mr. GOODCHILD: That is a most complex subject, and I should hesitate to say anything that might be used in evidence against me. But I do believe that

[1] Barth's journey to Tabonia from Tripoli took twelve days of travel, making twenty-eight days from the Lotophagi to the Garamantes. The actual distance from Tabonia to Wadi Gherbi is considerably more than that from Tabonia to Tripoli but neither Garamantes nor later folk would be tempted to linger over the southern part of the route.

those agricultural settlements which I tried to illustrate to-night could not have been made a success without a greater rainfall than there is to-day. On the other hand, I do not believe that this part of North Africa was ever a flourishing area with forests and vast cornfields and so on, as we have occasionally been led to believe. It was always a marginal area—semi-desert. The rainfall in ancient times was not a great deal higher than to-day, but it was just sufficiently higher to make possible the agricultural exploitation of the area by industrious and well-organized agricultural workers. It is not merely a psychological change which has taken place. The ancestors of the present Libyans were a great deal more industrious than the people there in the present day, but, on the other hand, I think nature was rather more on their side then that it is now. I cannot, for example, believe that in Roman times the village of Misda ever had to wait ten years for its rainfall.

A MEMBER: If there was not much change in the rainfall what was the main reason for the closure of these settlements about the ninth or tenth century?

Mr. GOODCHILD: I rather think the change in rainfall had a good deal to do with it. There was some change sufficient to make a certain amount of difference, but there were also other factors at work. The need for maintenance in these agricultural settlements was incessant, and once they started to break down it may have been difficult to arrest the process. There may have been over-grazing. Indeed the two types of agricultural economy—soil and herds—do not work in together very well and the tendency to keep herds may have reduced the amount of scrub and vegetation on the uplands. It may have been the combination of slightly reduced rainfall with neglect of artificial resources and difficulty of maintenance, as well as the general political insecurity resulting from the invasions from Arabia that turned the scale in favour of decay.

Mr. KIRWAN: How soon does Mr. Goodchild think we may have information concerning these sites to enable us to complete a map of Roman Libya?

Mr. GOODCHILD: The problem of producing any map purporting to show what the Roman Empire looked like lies in the fact that such a map can never be complete. It can represent only the state of knowledge at a given period. To produce a map showing in detail what Roman Libya looked like would require the work of two or three generations, far more finds than have so far been obtainable and more people to go out into the field. But, by correlating what was previously known with what was discovered in the nineteenth century and what was observed during the Italian occupation by some of the political officers, who were very observant people, and by adding the results of these recent reconnaissances, there is enough information to produce very shortly a map (with a certain number of blanks in it) of Roman Tripolitania.

So far as Cyrenaica is concerned all one can find to plot is the coastal cities and the main roads. Very little is known of the distribution of Roman remains in the interior; it is for that reason that, rather than continue in Tripolitania next summer, I am hoping to go eastward.

A MEMBER: From what source did the Romans get the stone for the buildings which have been shown us to-night?

Mr. GOODCHILD: These buildings are practically all in local stone, a very hard limestone which stands up remarkably well to the weather. There are no big quarries in the country except on the coast. In the interior one finds slight signs of stone digging around the actual buildings themselves. The Romans quarried out the stone from the site of the building often by digging a surrounding ditch. On the escarpments they simply quarried out the edges—at the outcrops. What it will not stand up to are the occasional earth tremors, and,

unfortunately, a great deal of sculpture has been mutilated by the Bedouin who persist in carving their tribal signs over it.

The PRESIDENT: If there are no further questions you will join with me in according a very hearty vote of thanks to Mr. Goodchild. I should like to point out that he takes the very worst period of the season for his excavations. I understand that he takes his summer vacations in Tripolitania, and the climate could not be more against him than it is. But we are immensely grateful to him for introducing us to the scenes of his excavations and giving us his results, and we look forward to hearing from him again when he secures still more interesting results. We thank him very much indeed.

APPENDIX

The cartography of the region

Existing large-scale maps of the Tripolitanian *limes* area are of varied quality. Two Italian bodies were concerned with map-making in Libya before the war. The first, the *Ufficio Studi* of the Tripolitanian (later Libyan) colonial government, directed for many years by the eminent geographer E. De Agostini, undertook the preparation of a series of 1/400,000 maps covering the whole country. From these, the British G.S.G.S. series of 1/500,000 maps have been compiled. The first sheets published by the *Ufficio Studi* were purely "schizzi dimostrativi," compiled from a small number of astronomical observations and from the verbal reports of travellers. A complete revision, based on ground observations and closed traverses, was in progress before the war, but certain sheets (including the areas of Mizda and Beni Ulid, of extreme interest to the archaeologist) were never fully revised.[1] Moreover, the hurried reduction of these maps to a 1/500,000 scale for use in the Libyan campaigns of the last war hardly improved their quality, and, in contrast with Cyrenaica, the amount of air photographic cover available for war-time revision was extremely small. That many complaints were made by war-time users of these maps is hardly surprising.[2]

The second Italian body concerned with map-making in Tripolitania was the *Istituto Geografico Militare*, which prepared a series of excellent 1/100,000 maps, originally intended to extend as far south as the thirtieth parallel. Had this aim been achieved the archaeologist would be excellently served. But the increasing preoccupation with military matters which followed the Ethiopian War resulted in the diversion of survey parties from the centre of the territory to the Tunisian and Egyptian frontiers, where maps of undoubted military value, but scant topographical or archaeological interest, were compiled. Nonetheless these 1/100,000 sheets are, despite the limited area they cover, of the greatest accuracy and use, and it is only unfortunate that the copies now generally available in Tripolitania are war-time editions produced hastily by mobile map units. Although these sheets have the advantage of a metrical "grid," the standard of printing is much below that of the originals.

The traveller in inner Tripolitania, whether geographer or archaeologist, has at his disposal therefore a very mixed series of maps. For the Gebel areas of Tarhuna and Garian he can obtain reliable, if badly printed, 1/100,000 maps, on

[1] The inset map of cartographic cover shows that of the area of permanent Romano-Libyan settlement more than a half lies in the region covered only by unrevised Italian 1/400,000 maps. Preparation of 1/100,000 maps for this area is greatly to be desired and would be of great value to scientists and administrators alike.

[2] No less an authority than Field-Marshal Lord Alexander refers to this situation in his Dispatch on the final phase of the Libyan campaign, published as *Supplement to the London Gazette*, 5 February 1948.

which ancient sites can be plotted with reasonable accuracy. For the *limes* areas further to the south, he is normally dependent on extremely poor 1/500,000 maps, or on enlargements of them on the 1/200,000 scale. Moreover, the army draughtsmen who re-drew these sheets from the Italian originals appear to have had much difficulty with the place-names, which are quite frequently mis-spelt.[1]

Existing motor-routes

The itinerant archaeologist, with limited time at his disposal, is necessarily dependent on motor-transport and, although this method of movement is ideal in open country of Western Desert type, there are few parts of the Tripolitanian *limes* zone which can accurately be described as open desert. Apart from the great bowl of the upper Sofeggin between Zintan and Mizda, and the lowest reaches of the main *wadis* near their junction with the Sebcha Tauorga, the country everywhere presents the appearance of a rocky plateau intersected by innumerable *wadis*, often steep-sided. In most areas the traveller has to decide whether to keep to the surface of the plateau and ruin his tyres, or attempt to follow the sandy and boulder-strewn beds of the *wadis*. The latter solution would normally be the best were it not that the *wadis* of greatest interest to the archaeologist have, almost invariably, long series of ancient terrace walls across their full widths, over which any vehicle must bump for miles, to the detriment of its springs. It is imperative, in these conditions, to make the fullest use of the existing roads and tracks whether they be the pre-war Italian routes, the war-time tracks beaten down by convoys of military vehicles, or the numerous roads recently constructed and maintained for the sole purpose of exporting esparto-grass from the collecting and baling centres which have been established throughout the Gebel zone. Many of the minor routes do not appear on the existing maps, being of recent construction; and many routes which do appear on the maps have either long been washed out or, since their original purpose was purely military, no longer justify the expense of upkeep.

It may be useful, for the benefit of future travellers, to list some of the routes which have been followed. For the detailed topography of most of them the reader is referred to the excellent guide 'Libya' published by the Italian Touring Club in 1937, and to a comparatively rare series of itineraries published in 1914 under the title 'Manuale Itinerario della Tripolitania,' with later supplements. The Italian forms of place-names have been retained throughout the present paper, since these forms appear on all the existing maps, and the advantages of concordance between bibliography and cartography outweigh the minor irritation of finding, for example, Shemek transcribed as Scemech.

There are four main routes of penetration into the interior, of which the best known is the western route from Tripoli to Gadames via Nalut, followed by many tourists and journalists in the pre-war days when luxury buses and "pseudo-Saharan" hotels offered African glamour with a minimum of discomfort.[2] Times have since changed: Gadames is now under French administration, and tourists from Tripoli rarely go as far as Nalut. As the writer's reconnaissances have not yet extended into the area between Zintan and the Tunisian frontier, the Gadames route has not been used. The remaining three routes of penetration are Tripoli–Garian–Mizda, Tripoli–Tarhuna–Beni Ulid

[1] For the correct (italianized) forms of the place-names it is essential to consult the two lists, each entitled *Elenco dei nomi di localita della Tripolitania Settentrionale*, published in 1916 and 1936 as supplements to the 1/400,000 and 1/100,000 map-sheets respectively. The lists are not however comprehensive.

[2] An 18-seater "autopullman" with bar and radio used to leave Tripoli for Gadames every week, returning after four days.

and Misurata–Gheddahia–Bu Ngem, all of which are of importance to the archaeologist, and have been followed recently. The Garian–Mizda and Tarhuna–Beni Ulid roads are regularly maintained and in tolerably good condition to-day, but the Gheddahia–Bu Ngem road, severely "corrugated" by heavy war-time use, is a tedious one. From Mizda a road in poor condition goes southwards to the oases of Gheriat, and from Beni Ulid a rough track, adequate for robust vehicles, goes south-eastward via Bir Tala and Ghirza to join the Gheddahia–Hun road at Bu-Ngem. The sector of this road between Bir Tala and Ghirza is, curiously enough, omitted on the military "Going Overprint" (November 1942) of the appropriate 1/500,000 map sheet, in which the area in question is marked as "generally impassable"; and the information on these "Going Overprints" is, in general, to be treated with extreme caution. Also from Beni Ulid, reasonably good roads go southwards to Scemech in the Wadi Sofeggin and north-eastward, via Mselleten and Bir Dufan, to meet the coast at Zliten and Misurata.

Apart from the bitumenized Gebel road linking Nalut with Garian, and Tarhuna with Homs (the centre section between Garian and Tarhuna was never constructed, and a rough military road between these two places has since been interrupted), there is an important lateral route, running mainly in desert terrain, which follows the line of the upper and middle Sofeggin basins. Leaving the Gebel road at Zintan one can, with suitable vehicles, motor south-eastwards to Mizda, passing important *limes* outposts at Gasr Duib and Gasr Uames, and following the approximate line of a Roman road, the course of which is marked out by milestones.[1] From Mizda one can continue eastwards, still following the Sofeggin, to Bir Scedeua and thence by Gasr Tininai to Scemech and Bir Tala. Mizda itself was undoubtedly a Roman outpost of strategic importance, as two Roman roads meet there, but its Roman fort must be buried beneath one of the two Berber villages which now occupy the small oasis. East of Mizda the Sofeggin narrows to become a deep gorge and the level of its bed drops 200 metres in its passage to Scemech.

This sector of the Sofeggin has many ancient sites, but the road through the Wadi is badly blocked by wind-blown sand, and a faster route (passing only one major ancient site, at Bir Dreder [2]) can be used by following the Gheriat road as far as the Wadi Gellali and then branching eastwards across open country to Bir Dreder and Bir Scedeua. The area of Bir Scedeua offers to the archaeologist a remarkable series of Romano-Libyan fortified farmhouses with adjoining mausolea, as well as a curious natural phenomenon, Ain el-Mizragh, a deep cleft in the surface of the rocky plateau which is the favourite haunt of pigeons. A nearby landing-ground, no longer usable, enable Marshal Balbo, that prince of "*cacciatori*," to indulge his favourite sport without a tiring desert ride. Rues et-Tabel, a group of low hills on the opposite side of the Sofeggin to Bir Scedeua boasts the only inhabited house between Mizda and Beni Ulid, built recently by Hassan Shebani, official distributor of government rations to the nomadic Ulad Bu Seif.[3] A little further to the east, and visible

[1] For these and other milestones in Tripolitania, see my paper "The Roman roads and milestones of Tripolitania" (Tripoli, 1948).

[2] Bir Dreder, a group of wells in the bed of the Wadi Dreder, has adjoining it the site of a large cemetery of Libyan "tribunes," officers who commanded native levies for the defence of the Roman frontier during the fourth century A.D.

[3] Our ground party enjoyed the hospitality of this gentleman for several days during the summer of 1949, when nearby ruins were being examined. Rues et-Tabel has become the main centre of the Ulad Bu Seif, in place of the Italian-built village of Bir Nesma, which was less favourably situated and has now been abandoned.

for many miles, is Senam Tininai, a small Romano-Libyan temple, the only known pagan shrine in the whole Sofeggin basin.

The minor routes followed by the writer are too numerous to list here in detail, but reference must be made to a road of considerable geographical interest which goes eastwards from Garian, crosses the summit of the Garian massif near the highest mountain in northern Libya (El Glaa, 968 metres) and then descends southwards to terminate at Bir Tarsin. On this route one can observe clearly the gradual transition from "high plateau" vegetation to "steppe" and eventually to rocky desert. Bir Tarsin itself, marked by an abandoned Italian fort and a war-memorial, is a group of some twenty wells of the greatest importance to local nomads who bring their camels and goats to water here. The surrounding plateau is bleak to a savage degree, and one does not envy the Italian garrisons who occupied this post. According to many Italian maps Bir Tarsin is linked with Mizda by a good motor-road, but no such road actually exists, and the intermediate country is almost impassable to vehicles. A British Civil Affairs Officer, feeling that it would be easier to build this road than to correct the cartography, began work from the Mizda end, but it was never completed.[1]

[1] To this same officer, Captain C. Tower, we owe the fast motor route from Mizda to Bir Scedeua, via Bir Dreder.

THE EXPANSION OF JAPAN: A STUDY IN ORIENTAL GEOPOLITICS

CHARLES A. FISHER

PART II. THE GREATER EAST ASIA CO-PROSPERITY SPHERE [1]

THE TERM Greater East Asia combined in Japanese eyes the advantages of correcting the supposedly misplaced emphasis of the English expression Far East, with a convenient vagueness due to its novelty. On grounds of political expediency neither the territorial extent nor the proposed status of the component units was ever announced in advance with any precision. The nearest attempt at definition before the Pacific War was contained in "A statement to the United States concerning the Three-Power Alliance" (Germany, Italy, and Japan), made by Matsuoka (then Foreign Minister) on 5 October 1940. It began: "The construction of a new order in East Asia means the construction of a new order (*sic*) under which Japan establishes the relationship of common existence and mutual prosperity with the peoples of each and every land in Greater East Asia, that is East Asia including the South Seas. In a position of equality with every other country, Japan may freely carry on enterprises, trade, and emigration in and to each and every land in Greater East Asia, and thereby be enabled to solve its population problem." [2]

The views of other spokesmen however appeared frequently to go even farther than this. Numerous references to "Greater East Asia's population of a billion souls" implied the inclusion of India within the sphere, while the indeterminate name South Seas was interpreted by many to embrace the whole or part of Australasia. But, reading between the lines of the more authoritative pronouncements, one is disposed to conclude that, while the Japanese never relinquished their shadowy dreams of future hegemony over both of these areas, the Co-prosperity Sphere was limited to somewhat more feasible proportions and included, in addition to the lands already acquired, or in process of being taken, the whole of peninsular South-east Asia and the East Indian islands. It was therefore virtually identified with the maximum area later occupied and controlled by the Japanese between 1942 and 1945.

From a geographical point of view this vast territory exhibits considerable homogeneity in several important respects. Essentially it comprises the lands fringing the series of epicontinental seas on the eastern margins of Asia. To the west its limit corresponds closely to Lyde's "critical 95°–100° longitude" where "the typical Atlantic east-and-west trend of the feature lines gives place to the typical Pacific north-and-south trend," [3] Thus, apart from Far

[1] The first part of this paper, "Continental and maritime components in Japanese expansion" appeared in the last issue of the *Journal*.

[2] J. C. Grew, 'Ten years in Japan,' London, 1944, p. 295.

[3] L. W. Lyde, 'Asia,' London, 1933, p. 35.

Eastern Russia, whose outlook nowadays is directed towards Moscow,[1] it includes the whole of the Asian Pacific hinterland. Still more significant is its eastern and southern border, the line of island arcs formed by the Kuriles, Japan proper, the Ryukyus, the Philippines, and the Greater and Lesser Sunda islands of Indonesia. In all these insular territories the intricacy and refinement of relief typical of the Japanese topography is repeated, thus posing fundamentally similar problems in land utilization throughout.

It is true that in respect of climate important differences occur between the temperate parts of Japan proper, the tropical islands of Formosa and the Philippines, and the equatorial belt still further south; but none the less an element of uniformity, overriding all local variations, derives from the monsoonal incidence of rainfall. Moreover, both relief and the wind systems combine together to canalize movement along meridional lines, as the peopling of the area from prehistoric times onwards testifies. Thus alike on land, along the longitudinal valleys leading southwards from China, or at sea, sailing under the influence of favourable winds from one island to the next along the Pacific arcs, peoples of predominantly Mongoloid characteristics have spread throughout the whole of "Greater East Asia." Had the Japanese wished to do so, they could have made much of the fact that the Co-prosperity Sphere was the habitat of the "yellow race" [2] but, partly because their pronounced national inferiority complex was largely associated with the colour question, and also in the hope of enlisting Indian sympathies in their struggle against the West, they chose the less immediately controversial slogan of "Asia for the Asiatics."

An important aspect of population movements in historic times has been that of Chinese emigration which, in following the lines of least resistance, again emphasized the longitudinal grain of East Asia. While the overflow into Manchuria on the north, and into the eastern coastlands (and to a lesser extent, the interior valleys) of the Indo-China peninsula to the south, represented landward penetration, the extensive connections which developed between China and Malaysia depended on sea communications and the monsoonal wind systems.[3] Although Chinese emigration to all these areas has a history considerably antedating the Industrial Revolution, it increased greatly in volume as a consequence of the impact of the industrialized West on the Orient.

By virtue of their superior industry and commercial acumen, compared with the indigenous populations, the modern Chinese immigrants succeeded in the space of a few generations in acquiring an economic stranglehold over the peasant peoples of South-east Asia analogous to that recently exercised by Jews in many agrarian lands in eastern Europe. Thus while the Japanese,

[1] Despite the "trade divide" on the Trans-Siberian Railway in the neighbourhood of Lake Baikal. Only during the short-lived Japanese occupation of Far Eastern Russia following the First World War did the Pacific affinities of this region assume a political form. Since then the Soviet policy of economic and strategic decentralization has aimed at making the region self-supporting in all essentials. But the directives come from Moscow, and the Pacific contacts are negligible.

[2] Including the closely related yellow-brown peoples of Malaysia.

[3] Similar routes were utilized by Japanese mariners and pirates in their "Elizabethan era," the late sixteenth and early seventeenth centuries.

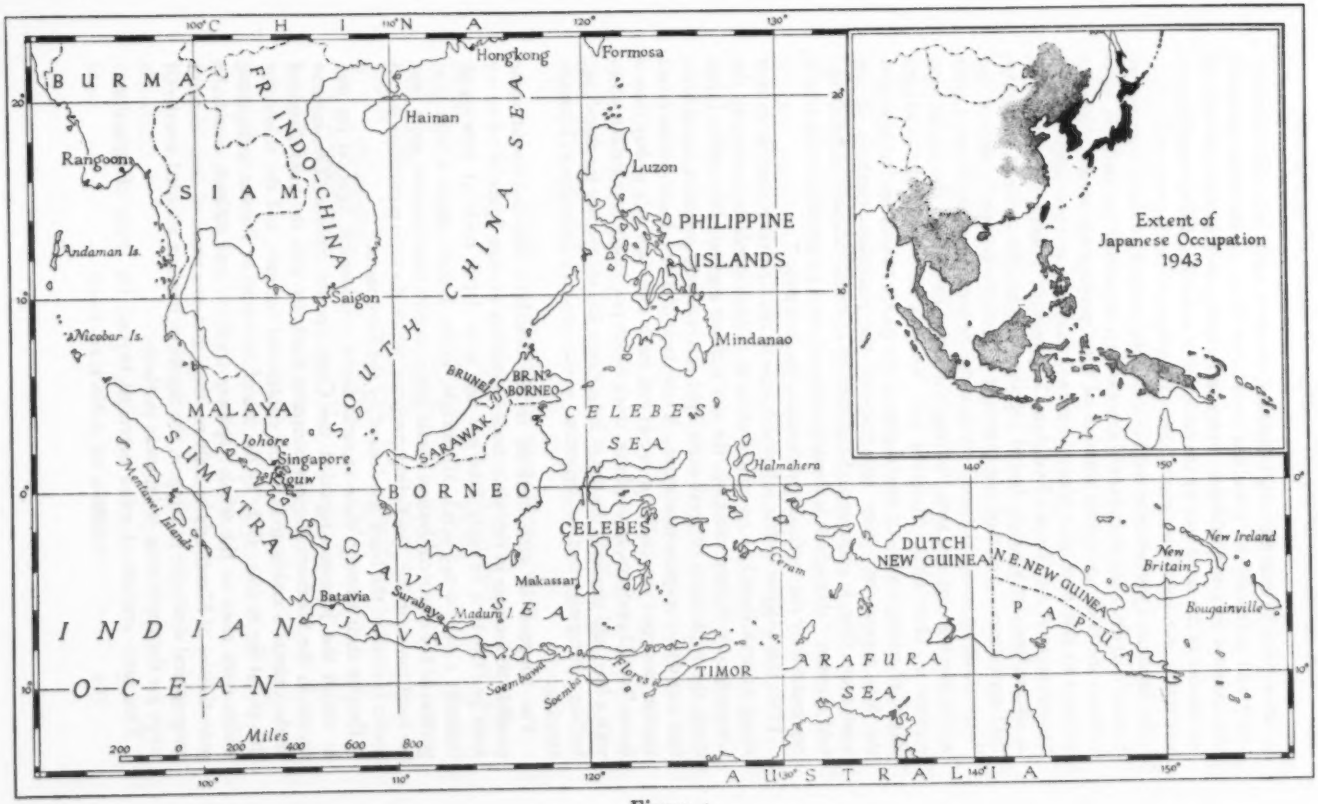

CHINA
BURMA
FR INDO-CHINA
SIAM
Hongkong
Formosa
Hainan
Rangoon
Luzon
SOUTH CHINA SEA
PHILIPPINE ISLANDS
Andaman Is.
Saigon
Nicobar Is.
Mindanao
BRUNEI
BR. N. BORNEO
MALAYA
SARAWAK
CELEBES SEA
Johore
Singapore
Riouw
Halmahera
SUMATRA
BORNEO
CELEBES
Mentawei Islands
DUTCH NEW GUINEA
N.E. NEW GUINEA
New Ireland
New Britain
Ceram
Makassar
Batavia
Surabaya
Madura
JAVA SEA
Bougainville
PAPUA
INDIAN OCEAN
JAVA
ARAFURA SEA
Soembawa
Flores
Soemba
TIMOR
Miles
200 0 200 400 600 800
AUSTRALIA
Extent of Japanese Occupation 1943

Figure 4

in attempting to oust western influences, strove to unify East Asia commercially and politically on grandiose totalitarian lines, an important common denominator of a very different order had already been introduced into the economies of the same area by the activities of individual Chinese middlemen and the operations of powerful Chinese Chambers of Commerce.

In Japanese eyes however the basic unifying feature of the Co-prosperity Sphere was its alleged cultural homogeneity, expressed primarily in agricultural methods. A special number of their propaganda review, *Sakura*,[1] devoted to this particular theme, outlined the view at some length. "The various areas of the Greater East Asia Co-prosperity Sphere, having Nippon as its nucleus, are strongly bound together through the medium of paddy-field agriculture—a method not practised in Western Europe"—since it was "dependent on seasonal rains." Within the Sphere, three subdivision were noted: the true wet rice area, "having Nippon as its leader," the dry farming regions of Manchuria, Mongolia and North China, and "the Southern Regions" where, on top of an indigenous wet paddy culture similar to that of the first region, had been superimposed the plantation methods of the westerners. But, in contrast to the artificiality of certain features of this three-fold division, "that which is fundamental and most progressive in the area is represented by the methods practised in the first zone."

From this analysis certain inferences were drawn. Extensive mechanization along western lines had no contribution to make towards cultivation in the Co-prosperity Sphere except in the dry farming regions. But within Japan itself, the application of small-scale light machinery to intensive agriculture had met with conspicuous success. A new type of 2 or 3 horse-power diesel tractor, designed especially for use in rice fields and "cheaper to buy than a horse," could perform, in one hour, work which previously took twelve hours with a hoe; and similarly the use of light motor and oil engines for threshing, hulling, pumping, and in irrigation works was revolutionizing Japanese farming.

The adoption of such methods in the Southern Regions would make possible an increase in rice yield from its existing average figure of 0·6 to 0·7 *koku* per *tan* to 2 or more *koku* per *tan*, as in Japan itself. (1 *koku*=4·96 bushels; 1 *tan*=0·245 acre). Meanwhile, under Japan's aegis, a high proportion of the estate cultivation would cease, to give room to grow more food for local consumption, "including green tea, which the local population would prefer instead of the black tea desired by the Europeans."

Despite their naivety, these remarks throw considerable light on the way in which the Japanese regarded the Co-prosperity Sphere. The interest shown in the Southern Regions contrasts markedly with the brief dismissal of the extensive arable areas of the continental margins, and the reason for this is not far to seek. Only by the use of American or Russian techniques, which were alien to the whole Japanese tradition and outlook, could the potentialities of Manchuria be fully realized. But as a result of their inherent geographical similarity to Nippon, the Southern Regions afforded wonderful scope for the application of Japanese methods.

This same attitude of mind prevailed beyond the limits of agriculture.

[1] *Sakura*, vol. 5, No. 1, pp. 21–33.

From the industrial and commercial standpoint an almost identical threefold division is apparent:

(i) The manufacturing and managerial nucleus formed by the main Japanese islands.

(ii) The continental base, primarily Manchuria and North China, providing temperate raw materials, and especially the minerals required in heavy industry, some of which was located there for strategic reasons.

(iii) The underdeveloped colonial lands of the south.

In this connection again the second region represents a disharmonious element, included as an unfortunate necessity dictated both by poverty of resources within the inner nucleus and by broader strategical considerations. But the imagination of the vast mass of Japanese was never fired by the Manchurian campaign or the "pacification" of China as it was by the subsequent advance into the Southern Regions. This, in Japanese eyes, was real imperialism at last.

Numerous references in their war-time periodicals to the doctrine that "he who controls the tropics controls the world" strongly suggest that the Japanese concept of empire was still, at least in part, rooted in a belief in the inescapable inter-dependence of temperate and tropical regions. To them the Southern Regions, or as they became known during the War, the Southern Resources Area, appeared the obvious complement to Japan proper. Geographically this situation expressed itself in the relative densities of population (see Table). Although the distribution pattern, in its perhaps excessive concentration on irrigable lowlands, showed throughout a general uniformity reflecting the common ideas of land utilization, the average density in the Southern Regions was only a sixth that of Japan. Thus, apart from the exceptional case of Java, and despite nearly two thousand years of colonization from without, the Southern Regions remained essentially pioneer lands, capable of supporting considerably larger populations.

The Co-prosperity Sphere, areas and populations

	Area (square miles)	*Population (1939) (thousands)*	*Density per square mile*
Burma	261,610	16,600	63
Siam	200,148	15,600	77
Indo-China	286,000	23,700	83
Malaya	52,286	5,579	107
N. E. I. (Indonesia)	735,268	69,435	94
Java and Madura	51,032	47,700	935
Rest of N. E. I.	684,236	21,735	32
British Borneo	81,761	951	12
Timor	7,330	480	66
Philippines	115,600	16,300	141
South-east Asia Total	1,740,003	148,645	85
China	2,903,475	425,000	146
Korea	85,246	24,050	282
Manchuria	503,073	38,000	75
Formosa	13,890	5,500	396
Japan	147,702	72,520	491

An equally significant contrast between Japan and the south lay in the respective modes of human activity. Both the Chinese and the occidentals had profited from exporting to South-east Asia an energy and vigour which were not indigenous there; the Japanese now proposed to do likewise. It is interesting to note that among Asian coolies, the Chinese alone appeared capable of really sustained heavy physical work in South-east Asia, as for example in the mining industry. But when, on occasion, during the "China Incident," Chinese coolies refused to work in various Japanese-owned mines in these areas, it became necessary temporarily to use Japanese labour and this proved equally able to stand up to the strain. Under the Co-prosperity Sphere however it was proposed to exploit this difference along familiar colonial lines, by employing Japanese in such local administrative, managerial and industrial posts as the situation demanded, while concentrating these activities as far as possible in the metropolitan country.[1]

But more important than these differences between the Southern Regions and Nippon itself was the basic geographical unity which transcended them. Indeed, to the Japanese the major contrast within the Co-prosperity Sphere lay not between its temperate and tropical portions, but between its continental and maritime lands. Already, before the southward drive of 1942, the Japanese empire differed from all others organized on the principle of temperate-tropical relationship, in that no clear line of economic demarcation existed between the homeland and the dependencies. This gentle economic gradient from the nucleus to the peripheries was to be extended to the limits of the Sphere, with areas like Formosa and the Ryukyus (or for that matter Korea, Sakhalin and even Hokkaido), occupying in varying degree an intermediate position, and the whole forming a series of concentric rings round the industrial and managerial core of southern Honshu.

A similar situation prevailed as regards the cultural relationships between the Southern Regions and Japan. For although the Japanese may have endeavoured in superficial respects to emulate the former western ruling caste into whose shoes they had stepped,[2] it was perfectly clear that in most essential matters their outlook differed but little from that of the native population. While everything pertaining to the Europeans, their houses, their clothing, their food, and their habits, remained completely alien to those of the indigenous people, their Japanese counterparts, evolved in past times in a similar southern environment, were all thoroughly familiar and comprehensible. Therein lay the uniqueness and the attraction of the Co-prosperity Sphere; and therein also lay its fatal weakness.

[1] This practice had been followed in Japan's older colonies. Thus already in 1931 35·1 per cent. of the employed Japanese population in Formosa belonged to the official and professional classes, and another 29·1 per cent. were in commerce and transportation. The 1933 figures for Korea, 35·2 and 29·4 respectively, were almost identical. See R. Ishii, 'Population pressure and economic life in Japan,' London, 1937, p. 193.

[2] *E.g.* before the Pacific War Japanese commercial and official representatives in South-east Asia were instructed to follow the European practice of resorting periodically to hill stations, allegedly for "health reasons," but mainly, it was generally believed, in order to impress on the local populations that the Japanese belonged to the "ruling peoples." Throughout Malaysia they insisted, both during as well as before the Pacific War, on being given the honorific "tuan" (master), and had also demanded to be classed as "Europeans" and not "Foreign Orientals" in the N.E.I. Census.

Many years before the Japanese made their brief appearance as rulers their exported manufactures had served to advertize their way of life. It is difficult for the westerner to realize the appeal that these often trumpery and shoddy goods exerted on the ordinary Asian peasant, nor should it be ascribed to inferior intelligence. Climate sees to it that most articles of common use, especially clothing and wooden ware, have a far shorter life in the humid tropics than in more temperate latitudes. For this reason the greater elaboration and superior workmanship of western products is superfluous: they rot or warp with almost equal rapidity, and much too quickly to justify their extra cost. Japanese manufacturers, on the other hand, showed an instinctively sympathetic understanding of what the consumer in South-east Asia desired, and provided it at a price within his reach.

Thus when in the early thirties the demand for European manufactures began to fall at an alarming rate, and all the colonial governments concerned introduced measures to restrict the importation of Japanese goods, the native populations, particularly in the Netherlands East Indies, resented this discrimination fully as much as did the Japanese themselves. Indeed many Hollanders are convinced that it was only the continued importation of at least an appreciable proportion of cheap Japanese manufactures that saved the Indies from revolution during the great depression.

The eventual arrival of the Japanese in South-east Asia in a military and administrative capacity gave further demonstration of their instinctive appreciation of the geographical peculiarities and problems of the area. Europeans who, like the writer, were forced unwillingly to participate in establishing the New Order were amazed at the Japanese genius for improvization in this type of country, just as the world at large had been astonished at their military successes there after their unconvincing performance in continental China. Major road and rail projects, relying on the most rudimentary techniques of wooden and bamboo construction for bridging and for the accommodation of labour were rushed through in less time than it would have taken European engineers to survey the route. The standard of workmanship was often dangerously low, but to outward appearance the object had been attained, and the local population was understandably impressed.

In the opinion of the writer it behoves the westerner to give fuller heed to these considerations, for it was largely on such matters that the Co-prosperity Sphere was judged by those most directly involved. According to western standards it formed a thoroughly unbalanced economic unit, most conspicuously deficient in the raw materials of heavy industry. To the Asian population the situation appeared otherwise.

The Japanese believed, probably correctly, that the coal and iron fields of Manchuria and China, supplemented by East Malayan iron ores, Philippine lateritic iron reserves and the widespread deposits of many of the principal ferro-alloys, provided a mineral basis sufficient for the heavy industry needed to sustain their arsenals, rail and machine shops, and shipyards. Apart from these the consumption of iron in the countries of the Co-prosperity Sphere was trifling, metal being replaced almost entirely by wood, bamboo, earthenware, or cement as occasion demanded. Sources of limestone abounded, and

the rapid growth of timber, and especially of bamboo, is phenomenal in monsoonal and equatorial Asia. Since little demand exists there for domestic fuel, apart from small quantities of wood or charcoal for cooking, the scattered coalfields of Malaya, Indo-China, Sumatra, and Borneo go far towards meeting local requirements, which are mainly those of shipping and the railways.

In contrast to coal reserves hydro-electric potentialities are for the most part good. West Java, for example, with its heavy and comparatively well distributed rainfall, short swift rivers, and numerous crater lakes, seems naturally well situated in this respect.[1] The occurrence in close proximity of both sulphur (associated with vulcanicity) and limestone provides a sound basis for an electro-chemical industry, while the bauxite of Johore and Riouw suggests similarly good prospects for electro-metallurgy. Much more important however in Japanese eyes was the scope afforded by hydro-electric power for the setting up of small-scale industrial units manufacturing textiles, cigarettes, rubber ware, domestic utensils, pottery, quinine, and the whole gamut of "light goods." For all of these the necessary raw materials were locally available in many parts of South-east Asia. Undoubtedly the rapid extension of cotton cultivation figured prominently in the Japanese programme, the relative suitability of the drier portions of Burma, Siam, Indo-China, the Philippines, and Eastern Indonesia being the subject of much discussion and research. In general, rubber and the coarse fibres replaced leather, notably for footwear, an important lead in this respect having already been given by the large Bata shoe factory established near Batavia some time before the Pacific War.

The proposed small establishments, closely modelled on the domestic factories of Japan, would have relied principally on native labour working under Japanese direction. In addition to a mass of small-scale industries, a handful of very large units (*e.g.* in the electro-chemical and electro-metallurgical industries) would probably have been established; but, as in Japan itself, there would have been a notable absence of factories of intermediate size. Thus, in industry as in agriculture, methods evolved in Japan could be readily adapted to the Southern Regions because of innate environmental similarities.

Although the events of the War years gave a very inadequate indication of the long-term plans, it seems reasonably certain that life in the Southern Regions under the Co-prosperity Sphere would have differed in two main respects from that under the previous regime. First, there would have been a higher degree of uniformity and inter-regional contact within its confines. The old political and economic fragmentation which divided the area into separate and often unnecessarily competitive units would have disappeared. In so far as the former arrangements distorted the natural flow of trade ideas, most conspicuously in the case of French Indo-China, the pattern proposed by the Japanese appears, on the whole, to be more logical.

One aspect of this change would have been a much greater measure of local subsistence farming and, in the form of small Japanese-directed industrial

[1] Although, under Dutch rule, partly because of the dominance of the profit motive and partly as a result of maintaining European standards of safety in transmission, costs of electric power in Java have hitherto been high.

units, of local subsistence industry also. In that sense therefore Japanese light industry would eventually have become decentralized throughout the area. That does not mean that any diminution was intended in the amount of manufacturing to be carried on in Japan, and indeed the reverse was clearly envisaged. But it is probable that, with the spread of the cheaper types of manufacture into the outer territories, Japan would have endeavoured to raise the quality of her home manufactures, and to concentrate on higher and more specialized grades than hitherto. In this matter, as in so many others, Japan would therefore have continued to follow the trend of Britain's economic evolution, with a time-lag of about half a century.

The acquisition of her own sources of raw materials, so Japan argued, would free her from dependence on the raw silk export to the U.S.A., which had hitherto been necessary to pay for imports of cotton, oil, scrap iron, etc., and at the same time open up still other possibilities of more specialized manufacturing. Thus plantation agriculture, though it might decrease in relative importance, would still remain a major activity in the Southern Regions, as would the exploitation of every form of mineral wealth, especially oil, on which the communication system of the whole unit would so largely depend.

And if life was to be made more localized, it would also become less elaborate, less highly organized, and certainly less commercialized. While to the westerner this is merely synonymous with an increase in poverty, the Japanese strove, not without success, to depict it rather as a return to a superior and more truly "Asiatic" mode of existence, closely bound to the soil and freed from the decadent accretions derived from the Europeans.

Already the social and economic structure of modern Japan conformed to these same austere principles. While the Japanese always endeavoured to present to the West the appearance of a highly complex industrial civilization, the internal organization of much of their national life was in reality exceedingly primitive. An intimate connection, which no Japanese politician ever dared ignore, existed between the traditional occupations of farming and fishing, on which the food supply depended, and the sources of man-power for the army and navy respectively. Owing to the high proportion of women employed in all but the heavier branches of industry, the extent to which urban man-power could be used in the services was considerably narrowed. Moreover the vast majority of the urban population was only one or two generations removed from the countryside, and retained much of the peasant's mental character. In times of industrial unemployment such people could return to the land with greater ease than European populations, and, although the consequences in rural poverty were tragic, the resilience of the economic system as a whole was greatly enhanced by this versatility. In the outer territories of the Co-prosperity Sphere this simplicity would have been retained, and the further advance there of western elaboration strongly discouraged. Japan's borrowing from the West was, in short, strictly selective. She desired its technique but not its cultural and spiritual outlook, failing to realize that the former was a natural growth from the latter, and one which would inevitably wither if transplanted to unprepared soil.

Although it may be impossible for us to accept these Japanese protestations

at their face value, it should be realized that such propaganda corresponded closely to the ideals of men like Gandhi and Soekarno, which exerted a tremendous appeal over the masses of southern Asia, and completely baffled the West.

Such was the theory underlying the Co-prosperity Sphere. But although for a brief interlude after 1942 nearly all the desired territories did in fact come under Japanese rule, the exigencies of war prevented any full realization of the plans originally envisaged. During the first year of the occupation a great effort was indeed made to carry them out according to specification, and the Greater East Asia Ministry [1] sponsored the establishment, under the Bank of Japan, of the Bank for the Development of the Southern Regions, with a capital of 100 million yen. According to the "Five Year Plan," also of 1942, the Philippines were scheduled to switch over from the production of sugar to cotton, and it was hoped to have 9·1 million acres under the new crop by 1946. Meanwhile Java was to concentrate on sugar, Indo-China on jute, and Borneo on minerals (especially oil) and timber. All these areas were also to be made self-sufficient in rice, but in other respects the programme was based on local specialization with a careful eye to comparative costs.

These grandiose projects were short-lived. The Japanese merchant marine, which in 1939 had been estimated at 5,600,000 tons, but was already beginning to dwindle by 1943, proved utterly incapable of integrating this vast insular and peninsular empire. As early as 1942 the Vice-President of the Nippon Yusen Kaisha had stated that 17 million tons of shipping were needed in order to utilize the economic potential of the conquered lands satisfactorily; and despite the absolute priority given to the building of modern ships in Japan and the manufacture of smaller wooden vessels in Hong Kong, Borneo, Celebes, and even New Guinea, it became clear by mid-1943 that the whole transportation system was rapidly breaking down.

Thereafter the policy changed to one of economic decentralization. Some 10,000 cotton spindles lying idle in Japan were transferred to the Philippines, near to the source of raw material and separated from Japan by a relatively short sea journey. Plans were drawn up for the establishment of blast furnaces in Malaya, southern Borneo, and Indo-China, localization depending on the presence of either iron or coal. Various other industries, especially of the lighter varieties, were also introduced throughout the Southern Regions. Considerable developments took place in synthetic commodities, Philippine sugar being used for the manufacture of buthanol and alcohol, while attempts were made to convert Malayan and Indo-Chinese rubber into petrol substitutes and textile fibres respectively.

In August 1945 the elaborate expansionist schemes of Japan came to an abrupt termination, and the Co-prosperity Sphere is already relegated to oblivion. Yet the cause of this failure on the part of the Japanese leaders appears to lie less in an unsound grasp of geographical realities than in an inadequate appreciation of the time factor, and a lack of historical perspective.

From a purely geographical point of view the proposed Co-prosperity Sphere had much to commend it. Regional peculiarities of both relief and

[1] Established in November 1942, it consisted of four Bureaux: General, Manchurian, China, and Southern Affairs.

climate seem to favour a longitudinal grouping of territories in East Asia, dependent primarily on maritime links. Moreover the intrusion of extensive stretches of older "secondary Pacific" lands, with their important coal and iron reserves, into this geologically youthful region makes possible a degree of economic balance unobtainable elsewhere in the Pacific Basin.

Such a balance was not however achieved, owing to the haste with which the project was rushed through in response to the quickening pace of external affairs over which Japan had no control. Before Manchuria had been economically assimilated circumstances suggested that the time had come to advance into China. Two years later, when no decision was yet in sight there, the outbreak of the Second World War reminded the Japanese of the undeclared basis of their foreign policy: Europe's difficulty is Japan's opportunity. Since neither China nor Manchuria interested them as fully as did the Southern Regions, they allowed themselves to be lured, dangerously unprepared, into further aggression with the inevitable results which duly followed.

These are short-term considerations, but they were the outcome of more fundamental historical trends. The urgency of "Japan's Divine Mission" arose from the gathering momentum of nationalism, both economic and political, throughout eastern Asia. Although China provided much the most important example, many lands in the Southern Regions also were beginning to develop their own manufacturing industries, which must ultimately have entailed serious consequences for Japanese export trade.

Several years before the outbreak of the Pacific War, local feeling in Indonesia had contributed to the initiation of an industrial programme, the execution of which was hastened after the German occupation of Holland in May 1940. The type of manufacturing envisaged conformed closely to that favoured by the Japanese; but in scale, the plans of the N.E.I. Department of Economic Affairs went far beyond anything that Japan contemplated. Indeed, under the Dutch proposals Java was destined to become the industrial and managerial nucleus for the archipelago, a rôle precisely analogous to that envisaged by Japan for herself in the Co-prosperity Sphere as a whole. Such a course of evolution thus ran counter to all Japan's desires for the Southern Regions, and the proposals of the Yoshizawa Trade Mission to the Netherlands East Indies in 1941,[1] which in tenor and content bore a strong resemblance to the famous Twenty-one Demands (to China), showed that she was determined, should the chance ever arise, to introduce instead a policy of colonial exploitation of the crudest kind.

While, during her occupation of Indonesia and other parts of South-east Asia, Japan was therefore able to pose as the champion of the "Asiatic" way of life against the Occidentals, the more perspicacious nationalists realized the retrograde implications of her proposals. For, all political considerations aside, Japan's relative industrial immaturity rendered her incapable of replacing the West as a supplier of producer goods [2] without which the

[1] See H. J. van Mook, 'The Netherlands Indies and Japan,' London, 1944.

[2] Between 1930 and the outbreak of the Pacific War Japan did make a great effort to reach maturity in this respect. Even by 1937 the index of industrial production had risen to 167 (1931–33 average=100), and this is accounted for primarily by increases in the output of capital goods in which, on balance, she had become an exporter. But

economic life of the Southern Regions must remain retarded. The New Order in short represented not an advance, but rather a return to the past: Japan was trying to apply the concepts of the nineteenth century in the twentieth-century world.

The events of the Second World War have greatly accelerated pre-existing trends. European influence in both the American and Asian tropics is fast receding, and although recent British projects for extensive agricultural developments in Africa suggest that a last stand may be made there, it seems inevitable that the rest of the century, at least, will be the era of great latitudinal states. Radically different though their economic and political structures may be, both the U.S.A. and the U.S.S.R. derive their strength basically from their east–west territorial extension on a continental scale, which makes possible a larger measure of homogeneity in ways of life and thought among so large a population than would be possible in units of comparable size aligned along a north–south axis.

Owing to the peculiar configuration of the western Pacific margins the former line of development made little appeal to the Japanese, for lateral landward expansion into Manchuria involved too great a break with traditional modes of livelihood. Paradoxically, it appeared, if Japan wished to build up a large sphere of influence in accordance with the exigencies of twentieth-century power politics, her direction of advance should be longitudinal rather than latitudinal. But in this, as in so many other respects, she was steering counter to the prevailing current of the times. Therein lies the problem which still defies solution.

Throughout the twentieth century the shrinkage of distance has continued with ever growing momentum, so that to-day it is a mere truism to insist that the world must move rapidly towards either some closer political integration or towards disaster. But although in this very real sense it is customary to insist that we are faced with the choice between "one world or none," geographically speaking the contrasts between the Atlantic world and the Pacific world cannot be so easily dismissed. Despite the vastness of the Pacific Ocean, its fringing lands as a whole comprise but a small proportion of the earth's surface whose general character does not harmonize with the rest. In North America, under more favourable conditions than prevail elsewhere, it has proved possible in a sense to resolve the discord, so that to-day the Pacific coasts of Canada and the U.S.A. are satisfactorily integrated with the areas east of the great Cordilleras. In South America similar attempts met with no lasting success but, in view of its isolation and relatively small population, this constitutes a local rather than a world problem.

But the western Pacific is neither remote nor sparsely peopled; on the contrary it is contiguous with the core of the Asian continent, "the geographical pivot of history," and contains the greatest concentrations of population in the world. The Co-prosperity Sphere was an attempt, in serious

it must be realized, first, that the expansion of the heavier industries was on an uneconomic basis, requiring heavy subsidies and, secondly, that nearly all but the lightest machinery exported went to areas within the Yen Bloc, mainly to Manchuria, Japan's own private continental base. There was little surplus available for export elsewhere and the situation is very much worse in this respect since the War. See Jerome R. Cohen, "Japan's Economy on the road back," *Pacific Affairs*, 21 (1948).

respects outmoded, to tackle the problem which must always remain inherent in this situation. Since however it created more problems than it solved, what had formerly been the "Far Eastern Question" became in recent years simply the "Japanese Menace." But the liquidation of the Japanese empire does not of itself provide a lasting answer, and indeed renders the position, at least temporarily, more acute than before.

The confinement of Japan to the four home islands and the destruction of her industrial potential leave a vacuum which the several rival contestants are striving in different ways to fill. At present the opposed ideologies of the U.S.A. and the U.S.S.R., the conflicting forces of the new nationalisms and the older western imperialism, and the vociferous claims of Australia to a decisive rôle in Pacific affairs are seemingly at hopeless cross purposes.

Superficially the simplest solution to the immediate problem is that now favoured by the U.S. State Department of restoring the *status quo ante bellum*, at least to the extent of making Japan once again, in the words of the Draper Report, "The workshop of the Far East." So far as Japan itself is concerned, such a policy might go far towards securing a reasonable basis of existence, provided that her enormous pre-war expenditure on both army and navy is not repeated and that, as now seems possible,[1] a serious attempt is made meanwhile to check the high birth rate which has prevailed since the Meiji Restoration. These two provisos mean in effect a complete reversal from a dynamic to a static outlook on a national scale, so revolutionary in its implications that, were it not for the precedent of the Tokugawa Seclusion, one would refuse to believe in its feasibility.

But, granting even this, it nevertheless remains true that for the Draper policy to succeed, external conditions must also be favourable and in this respect the reaction of Japan's neighbours, based partly on sentiment and partly on economics, is far from uniform. At the one extreme India, which was spared the horrors of Japanese occupation, has consistently championed Japan's requests for a restoration of her pre-war industrial capacity. This appears to arise from the belief that an unlimited supply, from non-European sources, of cheap manufactured goods which India alone cannot provide, would assist the countries of South-east Asia in their struggle for complete independence, and so strengthen the Asian nations as a whole.

The policy has however been roundly condemned by the British Pacific Dominions, notably Australia,[2] not simply because of war-time experiences or because the military threat to them of a resurgent Japan is particularly serious, but also on account of long-term economic considerations. For if geographical configuration suggests that the western Pacific basin should be organized economically as a giant maritime trading sphere on the basis of temperate and tropical inter-dependence, Australia, the one political unit in the temperate belt of the southern hemisphere which appears to possess the necessary raw material basis for large-scale industrialization, is beginning to see itself in succession to Japan as the nucleus for such an organization. Thus

[1] In 1948, when the birth rate rose to 34·8 per 1000, one of the highest figures recorded in Japanese history, the Diet passed the Eugenics Protection Law, and on 1 April 1949 the free sale of contraceptives was permitted.

[2] See, *e.g.* W. Macmahon Ball, "Reflections on Japan," *Pacific Affairs*, 21 (1948).

Australia also, but in a somewhat different way from India, is striving to cultivate the goodwill of the countries of South-east Asia, while at the same time maintaining its traditional White Australia policy.[1]

But if the assumptions on which the foregoing analysis rests are sound, neither of these courses can, in the nature of things, be conducive to economic, social, or military stability in this part of the world and, on account both of its area and its population, it is in China that the issue is most likely to be decided. Moreover, in respect alike of strategic position and mineral and agricultural resources, the lands of northern China, including Manchuria, hold the ultimate key to the future of the western Pacific basin by virtue of their exotic geographical and geological character. It is here perhaps, even more than in Europe, that the decisive struggle between the conflicting forces of contemporary power politics is taking shape.

The recent visit of the Chinese Communist leaders to Moscow was clearly of vital importance in this connection, although thanks to the cryptic wording of the official statements arising therefrom it is still impossible to estimate precisely the significance of the negotiations which took place. It may be that the Sino-Soviet Treaty of Friendship, Alliance, and Mutual Assistance, concluded on 14 February 1950, foreshadows an immediate and formidable strengthening of the ties between Russia and China; and that its aim is to turn the latter into little more than a satellite on the East European model and bring into being a centrally-controlled land bloc of unprecedented magnitude, with an extensive frontage on the Pacific Ocean. Moreover, the apparent revival by the Chinese Communists of the pre-war irredentist ambitions of the Kuo-Min-Tang with respect to South-east Asia might clearly, if successfully pushed to its logical conclusion, result in further major increases in the Pacific coastline of this same land bloc, and in the eventual undermining of the Western position in the Indian Ocean region also.

Alternatively however the possibility should not be ruled out that the Russians, having learned by their post-war experience with Yugoslavia and appreciating the immensity of the difficulties involved in attempting firmly to control a people altogether vaster, more remote, and in no way less prone to xenophobia than the Yugoslavs, may be prepared to accept a new and far less rigid form of association with the Chinese. Such a policy would accord readily with the encouragement of Chinese expansionist aims in South-east Asia, not least in order to divert attention from Russian activities past and present in Manchuria and Inner Asia.

Which of the two policies appears from the Russian point of view to offer the better prospect of lasting accord between themselves and the Chinese is likely to remain a subject of speculation for some time and it becomes necessary to pick one's way with extreme caution amid the tangle of confused platitudes which the West has long delighted in propounding with reference to the Orient. While it is easy to refute much of the current talk among certain old China hands on the familiar theme that "nothing will ever change the Chinese," the uncritical assertions by many western admirers of the Chinese Communists, to the effect that the latter are imbued with a sense of purpose, responsibility, and integrity which is entirely without precedent in

[1] See Neil Stewart, "Australia—New Asiatic Power," *Eastern World*, 2 (1948).

modern Chinese history, are strangely reminiscent of the remarks made by similar observers in the early days of both the Sun Yat-sen and the Chiang Kai-shek regimes.

Again, although it is particularly dangerous in the contemporary era of uninterrupted technological revolution blindly to assume that history will nevertheless continue to repeat itself, and accordingly to pin one's faith in the well-worn generalization that China always absorbs its conquerors, the basic reasons for that belief are still operative. The immense numerical strength and the relative homogeneity of the Chinese people, intimately bound up as these are with the astonishing continuity of their civilization, necessarily present a problem to the Russians in no way comparable with that which confronted them in the eastern marchlands of Europe.

And finally, even if one were to join with the Marxists in accepting a purely economic interpretation of history, the fact remains that the Communist solutions to the problems of production and economic viability worked out in Russia since 1917 will need such drastic modification, to fit the fundamentally different land : labour : capital ratio which obtains in China, that the degree of possible convergence between the social and political structures of these two great states seems to be strictly limited. That is not to say that the Chinese Communists are "not real Communists" or unlikely to become so. Such comments could equally well be made of contemporary Russia, and the vital distinction appears to lie not between a real and false brand of the faith, but between urban- and rural-inspired variants thereof.

In short, the possibility surely exists that, however closely China, on grounds of pure expediency, may cooperate with Russia during the immediate future, the differences between the system which ultimately emerges a generation or more hence in China and its counterpart in the U.S.S.R. will be so great as to overshadow completely the deviationism of any of the eastern European satellites.

The failure of Japan's attempt to become the "Britain of the East" has demonstrated the inadequacy of ready-made Western solutions to the basically dissimilar problems of the Orient. This being so, it would seem that a satisfactory answer to the Far Eastern Question must depend to-day on the ability of the Chinese to profit from the example of Japan and, drawing upon the rich reserves of their own ancient civilization whose unparalleled survival may above all else be attributed to a genius for constructive compromise, to respond adequately to the situation with which they are now confronted. Crude attempts to turn China into the "Russia of the East" must entail disastrous consequences not only for China, but for the world as a whole. But if a stable and independent China, true to its historic traditions, were to arise at last out of the present chaos, the struggle between old and new concepts of imperialism and power politics might well lose a great deal of its relevance in what is potentially the most dangerous galaxy of political pressure points in the world. It should therefore be the long-term aim of Western statesmanship, however unpromising the situation may appear at the moment, to direct its every endeavour towards fostering such developments.

A JOURNEY BY TWO JESUITS FROM DHUFĀR TO SAN'Ā IN 1590

C. F. BECKINGHAM AND R. B. SERJEANT

THE JOURNEY of the Spanish Jesuits Antonio de Montserrat and Pedro Páez through Wādī Hadhramaut to Marib and San'ā as prisoners of the Arabs in 1590 has received less attention than it deserves. Helfritz is the only other European who claims to have reached San'ā by the same route, and Philby is the only other known to have approached Marib from the east, except for a mysterious person posing as a Moor of whom Arnaud heard.[1] Even the cities of Tarīm and Hainin were not, so far as we know, again visited by a European traveller until the nineteenth century. The account which Páez himself wrote of their journey is therefore of great interest. It is translated below.

The narrative of his captivity in Arabia is contained in chapters 15 to 21 of Book 3 of his 'Historia de Ethiopia,' which he dedicated to the General of the Jesuits in May 1622, only a short time before his death. In all probability therefore he was writing some thirty years after the events with which we are concerned. Though a Spaniard from Olmedo in Castile he wrote this work in Portuguese. He was in his last years one of the most powerful, and doubtless also the busiest, men in Ethiopia, for the Emperor, whom he had persuaded to abandon the Coptic Church and be reconciled with Rome, relied upon his advice in a great variety of spiritual and temporal matters. It is not surprising that some characteristics of his book betray hasty composition and lack of revision. His sentences sprawl, his vocabulary is repetitive, as if he did not spend time in thinking of synonyms, and he is guilty of anacolouthon; this perhaps helps to explain some of his errors of fact.

Some years later another Jesuit, Manoel de Almeida, included in his 'Historia de Ethiopia a alta ou Abassia' an account of this episode which is only slightly abridged from Páez. The histories of both Páez and Almeida remained in manuscript until they were incorporated by Beccari in his 'Rerum Aethiopicarum scriptores occidentales inediti,' 1903–17.[2] Meanwhile, in 1660, Balthasar Telles published a work compiled from them, 'Historia geral de Ethiopia a alta,' and he gave the story of the Arabian journey in some detail. It escaped the notice of the historians of Arabian exploration, Hogarth and Kiernan, and Kammerer seems to be the only scholar who has discussed the topographical problems connected with it.[3]

[1] The saiyids of Hadhramaut tell of a traveller called Al-Maghribī, *i.e.* the Moor, and say that he wrote a Rihla, or account of his travels. This may perhaps exist in MS.

[2] Páez' history will be found in vols. 2 and 3, Almeida's in vols. 5 to 7.

[3] "Le plus ancien voyage d'un occidental en Hadramaout," *Bull. Soc. Roy. Géogr. d'Egypte*, 18 (1933) 143–167. There are also short descriptions in two books on Ethiopia, Sir Charles Rey, 'The Romance of the Portuguese in Abyssinia,' 1929, and Elaine Sanceau, 'The Portuguese in Search of Prester John,' 1943. There are several inaccuracies in the brief account given by Cerulli in his article on Páez in the *Enciclopedia Italiana*.

The Red Sea port of Mocha, from Dapper's 'Beschryving van Asie,' Amsterdam, 1680

DE stadt MOCHA

The first part of the narrative may be summarized very briefly. In consequence of an order from the King (Philip II of Spain and I of Portugal) that a supreme effort should be made to send priests to Ethiopia, Montserrat and Páez left Goa in February 1589.[1] Unable to find a captain who would take them to Massawa, they changed their plans and decided to make their way through Iraq, Syria and Egypt. They were warned against this at Ormuz and embarked for Zeila but were captured by Arabs on 14 February 1590, soon after their ship had left the Kuria Muria Islands.

THE NARRATIVE

Next day they landed us a little before we reached the city of Dofâr.[2] As we were going along the shore a Moor,[3] whom we were taking with us to act as guide into the interior of Ethiopia, began to urge that Father Antonio Monserrate should say that he was a Moor and that they would then let us go. The father replied: "Because you see me here, do you dare to talk so disgracefully? I am not one to say so if I had to die a thousand times." At this the Moor was silent. When we arrived at the house of the captain of the city many Moors assembled and in their presence he asked us numerous questions about our journey. When these were finished he said: "I know well that you are spies and are going to Ethiopia to persuade the Emperor to make war on the Turks." He ordered them to put us in a room farther inside the house, where we were confined. We could not sleep all night because there were so many fleas and bugs. Next day they moved us to some very poor mud buildings which they regarded as a fort. We spent several days there and suffered much hunger; almost nothing of the little we were ordered to be given reached us because our guards ate it. While we were there the Moor whom we were taking from Mascâte visited us. He told us the captain of the city had decided not to kill us but to send us to the place where his King was staying so that the latter could condemn us to whatever death he chose. So that we should not say when we arrived there that the captain had taken away much baggage from us, he showed us what we had had with us in front of many persons and asked us if it was all there. We answered that it was and he then ordered it to be tied up and taken to the King as it was. In our baggage was a small image of Our Lady and another of the Magdalene. When they found these some of them turned away their faces and began abusing them to show their strictness in their accursed sect which condemns the adoration and the painting of images. A Xarife [4] (that is, one of the family of Mahamêd) blamed them for this and said that they were not doing right

[1] Páez says 1588, but Beccari has shown that all the dates he mentions in connection with this journey are one year too early. See Beccari, vol. 2, p. xii.

[2] Dhufâr. The spelling of names in the narrative is that of the original text. Elsewhere it is a translation in accordance with the latest state of R.G.S. II.

[3] All Muslims were called Moors by the Portuguese.

[4] Sharîf. It is curious that the term "Saiyid" is not used, for the Hadhrami Saiyids are descended from Husain, whereas "Sharîf" is generally applied to the posterity of al-Hasan. The term "Sharîf" is of course applied to the Saiyids as an honorific, and their women-folk are known as *saiyidas* or *sharîfas*.

since, although the painter had sinned, the pictures might be of holy men. They were all silent at this.

How they took us to the Moorish King and what happened to us on the way and on our arrival.

When the captain of Dofâr decided to send us to the King, they put us in a boat along with the baggage and guards and conveyed us by sea for five days.[1] We disembarked by a stream and travelled inland, not following a path and going among stones and thorn-bushes for about two leagues to a little village. I had been given some very tight Moorish shoes [2] and so I arrived there with my feet raw and covered with blisters. When we left next day they took us on foot behind the camels along a very stony path. I suffered great pain as I was going barefoot for my feet were very swollen and raw and I could not wear the shoes they had given me. Father Antonio Monserrate was not able to keep up with the camels, being already an old man.[3] Next day they allowed us to climb up among the camel loads. We entered into a great sand desert. When it was time to eat they lit a fire and prepared a quantity of locusts which they gave us to eat, but we could not put them into our mouths. Seeing this, they made a cake from a little wheat flour which they took from what we had had with us on the boat, and cooked it on the fire. Thereafter they used to give us this and nothing else. Our only regret was that it was very small and so we were always hungry.

There was little water in the desert so they measured out what we were to drink from the supply the camels carried. One day when we saw in the distance a valley and a large stream apparently flowing through it, we were very glad and were eager to drink as much as we liked. When we reached it we found it was only sand lifted up by the wind and rushing along like water. Then it did not rise more than three or four spans above the ground. Our escort said that when there was a strong wind the sand would sometimes be carried in one direction and would make great hills, and at another time in another according to the way the winds blew. The sun on these sands was such that the Syrian youth [4] and I were as good as blind and our eyes were running continuously because we had nothing but some little white caps on our heads; everything had been taken from us. Father Monserrate had been left a piece of coarse cloth which he put on his head and with it protected himself from the sun.

We travelled through the desert for ten days without meeting people or coming upon a path, for the wind covers it up with sand, so they set their course by the sun and at night by the Pole Star. On the last day at evening

[1] This voyage avoided the necessity of traversing the intervening territory of the Sultan of Qishn which was not subject to the Kathīrī Sultan, though Dhufār belonged to him.

[2] "Tight shoes" presents a difficulty because Arab shoes are not tight, but open, sometimes loose and flappy. When used by the unaccustomed they chafe the skin and the thongs cut into the flesh. If we could read *apertos* (open) for *apertados* (tight), it would be more in line with what obtains to-day.

[3] He was fifty, or nearly so, at this time, according to Páez, chapter 15, *supra*.

[4] He spoke Arabic, Persian, Turkish and some Portuguese, and was accompanying the priests as an interpreter.

we arrived at a big city which they call Tarîm.[1] The news spread that Portuguese prisoners were being brought and many people came out to see us before we had entered the city. At first they looked at us in amazement and said nothing. Then they asked our escort if we believed in Mahamêd. When the escort said that we did not, the people began calling us cafarûn, which in Arabic means lawless men.[2] They abused and insulted us a great deal, competed at spitting in our faces and began to lay hands on us. Our escort could not defend us as there was such a crowd in the streets that the camels could not break through. At last the situation became so bad that they were forced to take us into a house in great haste as the boys were beginning to pick up stones to throw at us. They kept us there for a day. On the next, before dawn, they took us away on foot very hurriedly until we were well outside the city, since they were afraid lest there might be a tumult when we left like the one there had been when we arrived. The camels came after us.

On that and the two following days we passed through many towns, but what had happened to us at Tarîm did not occur in any of them. There were many ruined forts along the mountain ridges [3] and our escort said that the Christians had built them in ancient times. In the last town we found a brother of the King named Xafêr.[4] He ordered them to take us to his house which was large. He was sitting on the floor on rugs, as is the Moors' custom. When we arrived he received us with courtesy, and made us sit down and be served with Câhua,[5] which is water boiled with the rind of a fruit they call Bun,[6] and which they drink very hot in place of wine.[7] He asked us who we were and where we came from, and after talking for a time, dismissed us. As we left he said to our escort: "These men are not to be made Moors." We left there that evening, travelled all night and arrived as day was breaking at

[1] Tarîm is a holy city, with innumerable saints buried in its cemeteries, and a centre of Islamic learning. To bring Christians there was not likely to be welcomed by the inhabitants. At the present day Hadhramaut does not permit Jews to enter at all.

[2] *Kâfirûn*, infidels. Originally "concealing," hence "concealing God's benefits," "ungrateful to God."

[3] By forts on the mountain ridges we suggest that Páez is not referring to the Jôl top, but to the spurs of rock that stick out of the scree slope below it. The tradition that there were Christians in Hadhramaut persists to this day. 'Abdullāh b. Muhammad al-Saqqāf, "Tārīkh al-Shu'arā al-Hadhramiyīn," Cairo, 1356 A.H., vol. 1, pp. 40 *et seqq.* and 48, mentions two Christian poets of the Kinda tribe born in Dū'an, and a Jew of Barhût living about the time of the appearance of Islam. It seems that certain sections of the Kinda were Christians, Imru'u'l-Qais, the famous pre-Islamic poet, mentions an anchorite. At Husn al-Ranâd in Tarîm an alabaster carving was found some years ago which resembles an angel's head.

[4] Ja'far b. Badr Bû Tuwairiq. See Salāh al-Bakrī, "Tārīkh Hadhramaut al-Siyāsī," Cairo, 1935, vol. 1, p. 131.

[5] *Qahwa*, coffee. The earliest reference to coffee by a European writer that has been traced antedates this journey by only eight years. See L. Rauwolf, 'Aigentliche beschreibung der Raisz,' 1582, pp. 102–3.

[6] *Bunn*, the coffee plant, or more properly, berry. Coffee in South-west Arabia is almost invariably made from the husk, and not the bean itself. In Hadhramaut coffee is made to-day with the husk, some berries, and spices such as ginger, all pounded and roasted together, the resultant concoction being known as *sharîkh*. Coffee at one time came under the prohibition of the *ulema*, and it seems that the earlier Kathîrî Sultans may actually have forbidden its use in Saiûn.

[7] *Qahwa* was originally a word for wine.

a city they call Heinân,[1] where the King was; he is called Sultân Humâr, that is King Humâr.[2] They took us to the fort where he lived. It was very large and lofty though built of adobes, as the buildings of that country usually are. They put us in a very small turret on the wall where we were no little troubled by the people who came to see us that day.

Two days after we had arrived the King ordered them to give us our clothes to put on, for we were nearly naked, but they did not give us everything. In the evening they took us to a flat roof in the loftiest part of the fort where we found the King seated on brocaded cloth in a place raised about four spans from the floor. He was wearing a tunic of very fine green cloth and on his head a toque fringed with gold thread. He would be a man of forty, swarthy and a good height. Before him was seated on rugs on the floor a Xarife, that is to say, a descendant of Mahamêd, whom they honour greatly on that account. All the rest, of whom there were many, were standing. We went so far as to kiss the King's hand and he invited us pleasantly to sit down. But he did not want to have our companion the Syrian as interpreter because they do not think well of Syrians. So he sent for a renegade woman of Peguan [3] race who was with the Queen. When she came the King spoke in Arabic and she said to us in Portuguese: "The King says: 'Do not be afflicted because God has brought you here.' I tell you that your sins have brought you among such evil people." He then asked us who we were and why we were going to Ethiopia. We answered that we were fathers and that we were going to Ethiopia to be with the Portuguese who had been there since they had first entered the country in old times.[4] Afterwards he asked us various questions, detaining us all the evening. At the end of the conversation we asked him as a favour to order that our books of offices should be returned to us. He replied: "Inxa Ala, Inxa Ala,[5] If God will, if God will." With that he dismissed us and we were taken back to the place where we had been before. Next day he sent us our breviaries and other books which were a great consolation to us and we thanked God for the great mercy of enabling us to say divine office.

[1] Hainin is the well-known town about the entrance to the main Hadhramaut valley in the west. It had a fort and market in Hamdānī's time, and he describes it as a big village (Qarya). Even at this time it may not have been a very large town, but it was a military base for Badr during his wars in Wāhidī, 'Aulaqī and Shabwa territory. To-day the fort is ruined, but of adobe as Páez says, and it has evidently been a large building. It stands on a little peak south of the old town, which is now in ruins. Fragments of eighteenth and nineteenth century Chinese pottery lie about, and some native Arab glass. But for the lack of water the fort would be impregnable. For photographs see D. van der Meulen, and H. von Wissmann, 'Hadramaut,' Leiden, 1932, p. 105. The area is being silted over with blown sand.

[2] *I.e.* 'Umar b. Badr Bū Tuwairiq al-Kathīrī, of the Āl Kathīr, the dynasty which rules Tarīm and Saiūn to-day. He was not the immediate successor of Badr. The latter was followed by 'Abdullāh b. Badr, then by his own son, 'Umar b. 'Abdullāh. 'Umar b. Badr succeeded towards the last decade of the tenth century A.H., and died in 1021 A.H. (A.D. 1612–13); Ja'far was his brother. 'Umar is described as being of noble character, a sound administrator and generous to the learned.

[3] *I.e.* Burmese.

[4] There had been Portuguese in Ethiopia continuously since the landing of Dom Cristovão da Gama at Massa wa in 1541.

[5] *In shā' 'llāh.*

We were there many days without being able to know the King's intentions, until one day the woman who had been our interpreter came to visit us. She told us that the King wanted to offer us for ransom but that he dared not do so until he knew what the Turks, to whom he paid tribute, would say. It therefore seemed to her likely that we should be moved. We asked her how she had been captured. She said that she was going from Châul to Ormuz in a ship when a storm arose and drove them to Xaêr [1] a harbour belonging to that King. As they were riding before the city some Moors came out to them in a little boat and told them that they were friends of the Portuguese and that they could safely land and take the refreshment they wanted. Thereupon almost everyone in the ship disembarked. When they reached land they were very well received but the next day they were seized. Moors had gone out to the ship with some boats, had captured it without resistance and had then brought them inland to the same city where the King's father was living. He had worked hard to convert them all, especially the Portuguese, of whom there were eight.[2] But they had always been very firm in the faith until they had died of disease, leaving only a certain black man. He used to be very friendly with a Moor who went every year with goods to the coast of Melinda. One day he asked the Moor to take a letter for him to the Captain there. The Moor said he would willingly take it and bring back an answer. However, he took it and gave it to the King, who did not neglect to read it. He said in the letter that if they were to come in a foist to a certain place which he named, they could, without meeting any resistance, take prisoners with whom they could ransom him and other Christians from India who were there as captives. The King was very angry at this, sent for him and asked if the letter was his. He answered that it was. The King said: "Then either you must become a Moor, or your head must be cut off." He replied that he was not the man to become a Moor, that he would do as he had chosen to do and, as the conversation went on, spoke with much Christian constancy and freedom. The King was very indignant and ordered his head to be cut off in his presence and thrown with the trunk through a window of the fort. After that they had kept the woman in irons for four years so that she should become a Moor. Then seeing herself in such a plight and having no hope of ransom, she had said she would be a Moor. But she said she was not one at heart and she had been there for forty years. We explained to her how glorious the death of that Portuguese had been and what she must do for her salvation, but though she shed many tears it was of no avail.

We spent four months in the prison suffering great privations, as do the natives as well, because that province of Arabia, which is called Hadarmôt, is very poor; most of it is desert and what is cultivated yields little because of

[1] Shihr.

[2] Bal-Faqīh al-Shihrī (Mukalla MS), p. 290, under the annals for the year 951 A.H. (1544–45) says: "They found a Frankish small boat (*barsha*) with some cargo, containing eight Franks, and they drew the boat up on the shore, and killed one of the Franks and took one prisoner. I think it had cast off from one of the Frankish ports." The King's father is, of course, Badr Bū Tuwairiq ob. 977 A.H. (A.D. 1569–70), and he probably used the Portuguese as gunners or technical assistants, as the Turks did in the Yemen.

the great shortage of rain. They have some wheat and barley [1] but their usual sustenance is millet. They also have some date-palms. The men are swarthy and usually dress badly. They wear their hair very long, curl it with hot irons [2] and then saturate it with butter so that when the wind raises the dust it becomes dirty. The women go covered with white clothes [3] when they leave their houses and their faces are hidden by a black veil like a nun's. They have some of the customs followed in ancient times in Israel. Thus, when a daughter of the King died, many women came from the neighbourhood on foot, their heads covered with dust. With much lamentation they took the Queen to a house near the fort where they stayed for a month or so mourning. They used to go out every day, morning and evening, on to the roof of the house, which was very large. They ranged themselves in two rows, face to face, clapped their hands together and from time to time threw their arms round each other's necks crying out loudly as if urging each other to lament more.

They do not bury their dead in the mosques but in the open country, as do all the Moors. They put many stones on the graves and anyone who can erects four pillars of stone and lime with a little dome upon them.[4]

They are all great devotees of Mahamêd in that country, and so they usually go about saying: "Ala Mahamêd,—God Mahamêd." [5] He who takes care of the mosque calls them to prayer, before dawn, at midday and in the evening,[6] saying in a loud voice from the top of a tower (which some call Alcorâm,[7] others Menâra [8]); "La Ila, ila Ala, Mahamêd Raçûl Ala, Alaiçalâ, alaiçalâ," [9] which means: "There is no God but God; Mahamêd is God's messenger. Pray to God." Herein they deny the Most Holy Trinity, for they allege that there is no Son. Therefore also it says in the first chapter of

[1] *Cevada.*

[2] Presumably Páez reports what he saw, but the hair of the Bedouin and peasants generally curls naturally, and they do not use curling-irons. The upper classes, the Saiyids, do not consider curly hair a mark of beauty, and many townspeople keep the head shaved. Tribesmen dress their hair with butter, or rather *ghee*, as Páez says.

[3] White is not generally worn in Hadhramaut by women when going out of doors nowadays, and Bal-Faqīh al-Shihrī mentions "black Hadhrami cloth" as a product of the country in one or two places, but fashions in women's clothing do change in Hadhramaut as elsewhere.

[4] For tombs in Hadhramaut see "The Cemeteries of Tarīm," in *Muséon*, 62, 1949.

[5] Presumably *Allāh Muhammad*, invoking God *and* Muhammad. Though there is no comma between the words Páez cannot be supposed to have been so ignorant about Islam as to think that the Prophet was invoked as God. From the various Arabic expressions that occur in the text one can judge that Páez acquired his Arabic very sketchily, and one may suggest that what he heard was the phrase *Sallī 'alā Muhammad*, Bless Muhammad. It is quite true that this phrase is used by people in the streets, *e.g.* porters asking passers by to make room, or when going along a dark street, to warn others of their presence.

[6] The call to prayer is of course made five times a day.

[7] This is the word normally used by the Portuguese for the Koran, as it is in this paragraph. There is no Arabic term for a minaret resembling it. Almeida has copied Páez' mistakes. He writes: "The Caciz (*i.e. qādhī*) calls them from the Alcorão three times a day" (Almeida, Bk. 5, ch. 2. Beccari, vol. 6, p. 12).

[8] *Manāra*, minaret.

[9] *Lā ilāha illā 'llāh. Muhammad rasūl Allāh. Haiyā 'alā 'l-salā. Haiyā 'alā 'l-salā.* This is a much abridged version of the Muslim call to prayer.

their Alcorâm: "God does not beget and was not begotten." [1] When they say those words by which they are called to prayer, they cover their ears with their thumbs. When Father Antonio Monserrate asked one of them why he did so, he answered that those words had such great virtue and efficacy that if they heard them they would burst. "I am very surprised at that" (said the father) "because I have heard them many times and many Moors hear them every day, and they have never affected me nor have I heard of any Moor that burst. Doubtless if it were true all the Moors would already have burst." With that the Moor became angry and went away without a word in answer.

How they took us to the Turks and examined us when we reached them

After we had spent four months in the Moorish King's keeping a Turkish Baxa [2] of the kingdom they call Yamân, which begins at the entrance of the strait of Meca,[3] received notice of us. As the King was tributary to him he wrote to him to send us there at once, since all Portuguese prisoners belonged to the Great Turk. The King was very sorry at this but as he has little power against the Turks, he decided to send us and with us four very fine horses so that he should not be accused of having taken much baggage from us, or of having been to blame in keeping us there so long without reporting it. He called the Moor who was to take us and said to him that he was to take great care on the road to give us food and everything else that was necessary, without waiting for us to speak, as we never asked for anything. He also ordered that we should be given horses on which to travel and a good guard as there were many robbers on that road.

When we had everything ready we left, on the Eve of St. John the Baptist. After travelling for two days we reached the last fort [4] of that kingdom, where they put water into leather bottles [5] and loaded them on to the camels. We went through a desert travelling at full speed for four days and nights without resting except at midday and at nightfall when the men and camels had their food. Then they lingered very little; there is not a drop of water in all that desert and so they were very afraid that the weather might become cloudy and prevent them from seeing the Pole Star, by which they were guided at night. There was no path, or sign of one, and if they had not travelled at night the water they carried would not have sufficed. We endured great hardships during those days, both because of the very vile gait of camels when hurried, and because of lack of sleep, which we did not dare to take when riding for fear of falling, as camels are very tall. In spite of travelling in such haste, and of the very great heat, they did not drink a drop of water the whole time.

On the fifth day in the morning we reached a well where we stayed resting until evening; we then resumed travelling for the desert was not yet at an end. When morning came bandits surprised a Xarife who had remained

[1] Not the first chapter, but the 112th.

[2] Pasha, or Bāshā.

[3] Mecca. The "Strait of Mecca" was a common Portuguese name for the Red Sea.

[4] Presumably Husn al-'Abr.

[5] Properly, of course, skins, though leather bottles are used for containing oils, etc.

behind and robbed him. It was of no use for him to say that he was of the family of Mahamêd. He afterwards showed himself much affected by this, and said they had not been satisfied with robbing him, but had given him many blows and punches without respecting his descent from Mahamêd.[1]

Next day we reached a small place called Melquîs,[2] where there were ruins of large buildings, and many stones with ancient lettering which the natives can neither read nor explain. There was a courtyard more than half a league away in which they used at one time to be buried. When we asked them what that building was, they answered that it had once been a very great city and that Queen Sabba had had many cattle there. If this is true it confirms what Brother Luis de Urreta 3 states to be beyond doubt in the sixth chapter of his first book. In order to reconcile the opinions of those who say that Queen Sabba, when she went to Jerusalem to see Solomon, set out from Ethiopia, and of those who claim that she set out from Arabia, he says that Queen Sabba was also mistress of part of Arabia Felix, inhabited by the Sabaeans and Homeritae. So when she went to Jerusalem she set out from Ethiopia, crossed the Red Sea, visited her vassals' territory on her way, and went on from there to Jerusalem. In this way both are telling the truth. We have already spoken of this subject in our first book, so that here I only remark upon it in passing.[4]

Pursuing our journey from Melquîs, we travelled for twelve days [5] through inhabited but very rough country. In crossing a wide stream Father Antonio Monserrate fell from his camel. As there was little water in it he struck the ground so forcefully that he did not recover consciousness for a long time; he was still badly injured when we reached the city of Çanâ,[6] where the Baxa of the Turks was. The governor, whom they call Subaxî,[7] came out to meet us on the road near the city, with men on horse and on foot beating kettle-

[1] The Saiyids not bearing arms, and having a special position, pass freely among many of the tribes. In view of the consideration they enjoy in South Arabia this man's indignation is not surprising.

[2] Evidently Marib. It is suggested that the name is derived from Haram Bilqīs, Mahram Bilqīs, names which are perhaps cognate with Umm al-Qīs which the *Encyclopaedia of Islam*, on Glaser's authority, gives as the name of an open space or *maidān* in the ruins of the old city. This is the first reference to Himyaritic inscriptions by a European writer.

[3] Luis de Urreta, 'Historia eclesiástica, política, natural y moral de los grandes y remotos reynos de la Etiopía,' Valencia, 1610, pp. 66–70. Urreta contends that there were two provinces called Saba, one in Ethiopia, and one, properly Sḥeba, in Arabia. He is often mentioned, and usually contradicted by Páez, who had been asked by the Father Provincial of the Society at Goa to write a work on Ethiopia which would refute Urreta's allegations about the activities of the Jesuits there. See the dedication of his history by Páez to the General of the Jesuits in Beccari, vol. 2.

[4] Páez refers to the Queen of Sheba's journey in Book 1, chapter 3.

[5] This, on the face of it, is surprisingly slow. Arnaud states that the journey from San'ā to Marib and back takes 14 or 15 days, T. J. Arnaud, "Relation d'un voyage a Mareb (Saba) dans l'Arabie méridionale," *Journal Asiatique*, 4, 5, Paris, 1845. Nazīh al-Muaiyad al-'Azm says that the caravans from San'ā reach Marib in about five days, 'Rihla fī 'l-Bilād al-'Arabīya al-Sa'īda,' pt. 2, p. 105.

[6] San'ā.

[7] Turkish *sūbāshī*, a police superintendent. Judging from the Arabic annals this term refers to a fairly high-ranking official.

drums. He ordered that the father and I should go on foot before his horse,[1] and in this way they took us through the principal streets of the city to the fort where the Baxa lived.

The rest of the narrative contains nothing of topographical interest except for the following brief description of San'ā in chapter 21:

"It was a very great city in ancient times but after the Turks had taken it the population declined so that there remained not more than about 2500 houses, of which 500 belonged to Jews. Within the walls, which are of thick mud with many towers, there are numerous gardens and orchards with many of the fruits that there are in Portugal. All are watered from wells, for there is no spring within the city."

The two Jesuits remained at San'ā until 1595. They were then taken to Mocha where they spent about a year before being ransomed and sent back to India. Both fell ill as a result of their sufferings and Montserrat succumbed. Páez, however, recovered, and in 1603 he succeeded in reaching Ethiopia where he passed the rest of his life.

APPENDIX

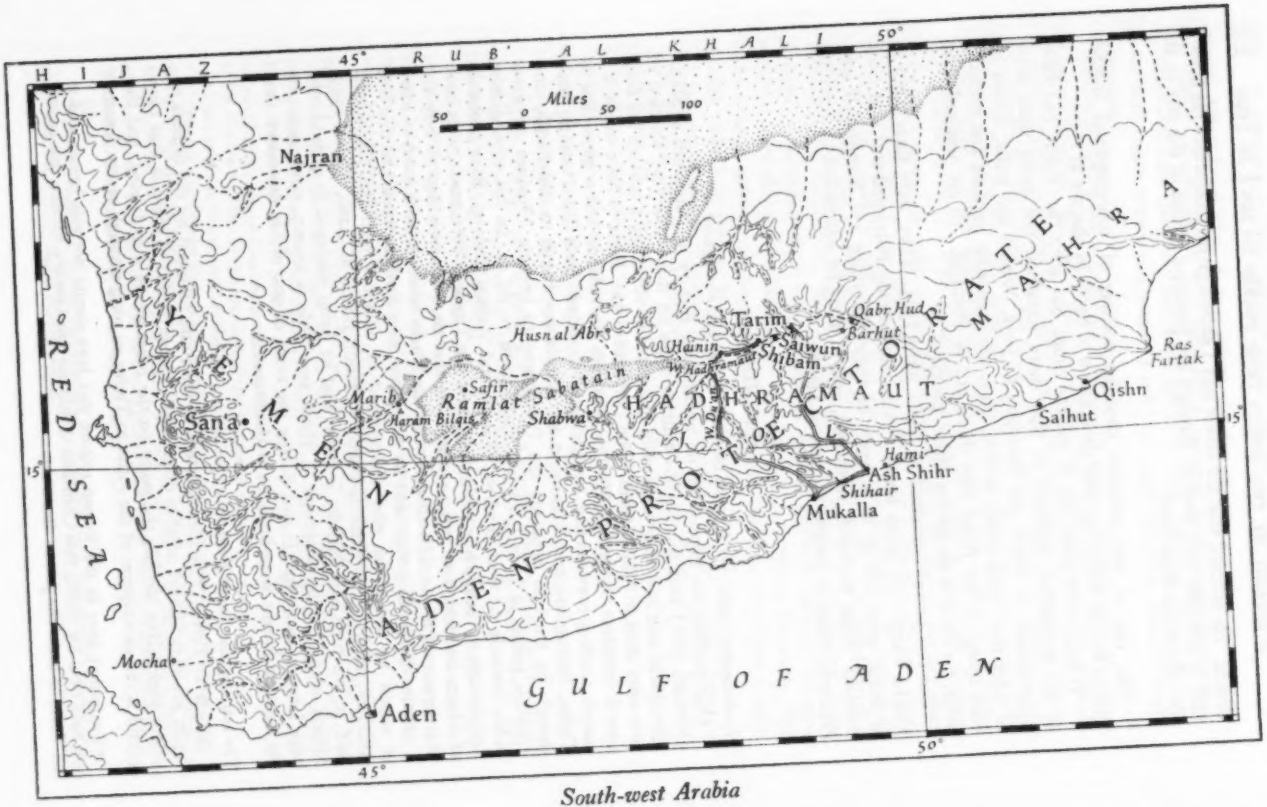
Hadhramaut under the Kathīri Sultans during the Portuguese era

One receives the impression on reading the history of Bal-Faqīh al-Shihrī (Mukalla MS.) that the Kathīrī Sultans were on the whole very tolerant of Christians, and that they were more interested in obtaining a ransom for their prisoners than in killing them. The Portuguese too, seem to have made it a sort of business to capture Muslim prisoners for ransom, but a good deal of simple trading between the two faiths is recorded. Badr Bū Tuwairiq used Turks, Portuguese and Mahris in his armies according to Bal-Faqīh, and though he tried to persuade the Portuguese to become Muslims no great pressure seems to have been put upon them to do so. In his expansionist policy towards the west, Shabwa, Wāhidī, and 'Aulaqī territory, Badr probably had enough to occupy him without fighting the Turks or Portuguese, with both of whom he treated at various times. At one time he even had to buy the Portuguese off Shihr. His alliance with the Turks however does seem to mark a definite change in policy, and he may have been further pressed to this line of action by the *ulema* who disapproved of alliances with the Christians. Although according to Salāh al-Bakrī, 'Fī Janūb Jazīrat al-'Arab,' Cairo, 1949, Badr at one time held Najrān, it seems that he never managed to expand into Mahra country. His successors of whom very little is known, never seem to have been so powerful. It was during the reign of one of his successors that the Spanish Jesuits were brought to Hadhramaut.

The route of the Jesuit Fathers

Dhufār to Tarīm. The identification of the route followed by the fathers to Tarīm presents several notable difficulties. The principal of these is that they cannot themselves identify the point on the coast where they landed, and the second is the description of the route to Tarīm as lying through sandy deserts.

[1] Sumptuary laws in the Yemen require that Jews should not ride horses, and it may have been the feeling that Christians should not ride beside a Muslim that caused the Turks to make the priests dismount.



South-west Arabia

At some indefinite date towards the end of February, and it is significant that the vaguest reckoning of the itinerary lies during the first days of their captivity when, perhaps, they were expecting to meet a speedy end, the fathers were sent off by dhow from Dhufār to the Sultan of Hadhramaut, 'Umar b. Badr Bū Tuwairiq al-Kathīrī. If reasons be required to explain why they should be sent by sea, let it be stated that a sea-journey would be quicker, easier and cheaper than the land-route, especially as the monsoon would then be blowing south west. Another reason, a political one, is that the Mahra with their Sultan at Qishn had been enemies in the past with Badr Bū Tuwairiq who never seems to have been able to develop his expansionist policy in their direction, and in 938 H. (A.D. 1531–32), nearly sixty years before, the Mahra had even threatened to take Shihr. As Badr had contracted a Turkish alliance, the Mahra probably inclined towards the Portuguese, and in default of further information at the moment we may assume that Mahra was still unfriendly to the Kathīris. At any rate it was undoubtedly politically impossible to send the prisoners to the Kathīri Sultan by land.

The next question is the point to which the fathers were despatched. Here the sole possible conclusion is that they were to go to Shihr, or at least to one of the lesser ports of the region. Shihr lies at the southern end of one of the principal routes to the Wādī Hadhramaut; it was the chief coastal administrative centre where one could hope to pick up news of the whereabouts of the Sultan, and in any case, five days' sailing at this time of year would take the travellers down to this region. But the prisoners were not landed at Shihr, they disembarked at a stream, and travelled inland. A possible explanation for this odd proceeding is that they may have overshot Shihr, a happening said to be by no means infrequent because if there be any slight obscurity in the atmosphere, Shihr, lying on a flat sandy littoral, is not easy to locate.

It is suggested therefore, that the party landed a little distance east or west of Shihr, perhaps near Hāmī to the east where there is a hot spring, the old city being concealed in the hills behind, and not visible from the sea, or else below Shihair to the west. Perhaps the leader of the party on picking up the information that the Sultan was not down at the coast, decided to save time by not entering Shihr, and joined the Shihr–Tarīm route at a point above the port.

So far then, a reconstruction of the route is simple, but nowhere in this region can we find a desert of the sort that Páez described. In the environs of Shihr it is true that there is quite a considerable amount of sand which Páez may have remembered, but the route to Tarīm lies across mountains and *jōls*, and they would have passed the sandy coastal area in the first day. By a process of elimination however, it is possible to show that the party cannot have arrived at Tarīm across deserts of sand. Kammerer's suggested landing-point in Mahra country is impossible as no journey could be made over such a vast extent of country in ten days, and in any case recent exploration tends to show that Mahra territory is a country of *wadis* running generally towards the coast. Furthermore, where Kammerer's theory is concerned, he fails to allow for a long enough sea-journey. The time factor excludes any possibility of their having come into Tarīm through the Empty Quarter from the north. Had they come up the Masīlah they would have mentioned the abundance of water, inhabitants, etc. Had they come up by a route to the west of Shihr they would equally not have gone through sandy desert, and in any case they would not have finished up in Tarīm, but Shibām.

We therefore conclude that writing some thirty years later, Páez tended to confuse his sufferings in the Empty Quarter or its off-shoots, with the first journey over the stony *jōls*. He must have kept some sort of record of his

travels, as the times taken to cross given distances can, at least, be fitted quite well to the circumstances, but during this period of their adventures the fathers probably had no means of writing a journal, for their breviaries were not returned to them till they arrived at Hainin, and they may not even have had writing materials at their disposal till they came to San'ā.

Ten days would be a very suitable time for an unloaded caravan to take to reach Tarīm from the coast. There are many ways across the *jōl* to Tarīm, but recent Arab authors such as Muhammad b. Hashim, 'Rihla ilā 'l-Thaghrain,' Cairo, 1350 H., give a route 'Aqabat al-'Arsha, al-Ghalāghīl. Arriving from the empty *jōl*, the travellers would suddenly come down into Tarīm by the 'Aqabat Bā 'Ashmī where the Al Kāf motor road ran at one time, experiencing that tremendous contrast between the rocky wastes and the Wādī Hadhramaut that so many travellers since Páez have described.

Hainin to Marib. When the fathers left Hainin, they did a rather unusual thing. They kept to the *northern* side of the Wādī Hadhramaut, and after travelling an evening and two days, they arrived at "the last fort of the kingdom" which can only be Husn al-'Abr, which is ancient enough as it was known to Hamdānī, 'Jazīrat al 'Arab,' (index). Nearly all other accounts of the Hadhramaut–Marib route in Arabic or in other languages, describe the *southern* route via Shabwa. For instance Saiyid Ahmad b. Hasan al-'Attās in a MS. work copied at Huraidha in 1948, 'Risāla fi Ansāb al-Qabāil al-Sākinīn bi-Hadhramaut,' writing in 1313 H., gives the following itinerary. "Now concerning what lies between San'ā and Hadhramaut, from 'Urūdh Āl 'Āmir to the lowest part of Wādī Duhur belonging to the 'Ubaidī and Nahdī (tribes) is the first stage; a second stage runs from this Wādī to Ramlat Shabwa, a third stage to Sāfir of the mountain of salt, a fourth stage from Sāfir to Marib of Sabā, a fifth stage from Sirwāh to al-Jamra (name dubious) a village of Khaulan, and a seventh stage from al-Jamra to San'ā till about mid-day." The stages between Marib and San'ā however seem a little long as compared with other travellers.

Philby is of the opinion, 'Daughters of Sheba,' London, 1939, that there are many routes across this desert to Marib. Judging from his maps and the American 'World Aeronautical Chart' (Restricted) Sheet no. 687, Sāfir lies some 85 miles west of al-'Abr as the crow flies. It would be a fair estimate to allow 120 miles on the ground for this distance, making approximately 30 miles per day over the four-day journey from 'Abr to Sāfir. From here about two days of travelling should bring one to Marib, though of course we have yet no reliable maps or distances for this part of Arabia. Sāfir then might conceivably be the well at which they arrived.

Now, it has been assumed that the fathers made for Marib although they do not mention this name, but speak of a place called Melquis. This need not however present any difficulty for Nazīh al-Muaiyad (*op. cit.*) mentions Haram Bilqīs as one of the great buildings of Marib, and a more recent traveller than any, A. Fakhri, "Les Antiquités du Yémen, Un Voyage à Ṣirwāḥ, Mārib et Él-Gôf," *Muséon*, 61 (1948) 227 calls the ruin Mahram Bilqīs, and it is apparently the great temple of 'Almaqah. A corruption of this name into Melquis would seem reasonable.

From Marib it might look as if the fathers had taken an unconscionably long time to reach San'ā to judge by the times given by other travellers. The party was however, taking with it a present of four horses as a *douceur* from the Kathīrī Sultan to the Basha of San'ā. After six days of continuous desert travelling in July these animals would be in very poor condition, even if their fodder had been conveyed on the camels, which themselves would be in poor condition after the long mid-summer journey without pasture. Unquestionably

the escort would linger on the way to San'ā to allow horses and camels to graze and recover their condition.

For the San'ā–Marib route, Ahmad Fakhri's itinerary might be quoted here, although the itineraries given by the several travellers [1] to Marib suggest that there are various ways there. Ahmad Fakhri left San'ā on May 1 by Sha'ūb, Wādī 'l-Sirr, al-Raudha, to spend the night at Ghadrān. Leaving Wādī 'l-Sirr for Wādī 'l-Shurafā next day they spent the night at al-Ahzuq; the third day they passed through the *naqīl* (pass) of Shuja' beyond which Harīb al-Qarāmīsh begins, spending the night at al-Akamah. The next day eight hours' journey brought them to Qā' Sirwāh, and later on eight and a half hours of travel took them into Marib. The whole might be reckoned as four days of travelling. Whether the fathers took this northerly route, or one of those lying farther to the south we have no evidence to help us to decide. One wonders indeed why they did not cross the desert by the Shabwa route, and it may be that political conditions did not allow of this, but until the historical material relating to this area and period has been published, it is impossible to say.

[1] Anastase Marie de St. Elie, "Aventures d' un Voyage en 1861 dans le Yémen," *Anthropos*, 4 (1909) describes the travels of Khodja Mikha Youssif an-Najjar of Baghdad to Marib, but while the account of this traveller's journey contains some useful information, it is entirely lacking in topographical data which might assist us to suggest a route for the two priests. The travels and reports of Halévy and Glaser are of course well known, the account of Halévy's guide Habshūsh having been discussed by Philby in *Geogr. J.* 102 (1943) 116–24.

THE GROWTH OF THE AUSTRALIAN IRON AND STEEL INDUSTRY[1]

N. R. WILLS

BETWEEN 1929 AND 1939 the production of pig iron and steel ingots in Australia increased threefold and the capacity of the iron and steel industry increased by an even greater amount. The production of pig iron from the then existing plants (The Broken Hill Proprietary Company, Ltd., at Newcastle, Hoskins Iron and Steel Works, at Lithgow, and Australian Iron and Steel Ltd., at Port Kembla) was 461,110 tons in 1928–29. By 1939 it had increased to 1,243,393 tons. Over the same period the production of steel ingots increased from 432,773 tons to 1,263,878 tons.

There is a remarkable story behind these substantial increases. In spite of the efforts of the pioneers who had struggled for many years to establish iron and steel smelting in Australia, the industry can scarcely be said to have existed in 1915. Only one town, Lithgow, on the mountainous western coalfield of New South Wales and about 100 miles inland from Sydney, had managed to sustain a smelting industry of sorts for any length of time. Cheap and plentiful fuel here gave the industry its initial impetus; later it was kept alive and even expanded, partly by the tenacity and optimism of its owners and partly by assistance from the government. But Lithgow too in due course went the way of former inland smelting centres. Its inferior position, for the assembly of raw material and for the distribution of finished products, reduced its chances of becoming a prosperous centre. Its production had never been large and the output in its best year was only a fraction of the total Australian demand. Long before 1929 the owners of the Lithgow plant had realized that they were ill-placed to compete with an iron and steel plant on either of the coastal coalfields of New South Wales—the Hunter Valley field to the north of Sydney or the Illawarra field to the south—and when such a plant was set up at Newcastle in 1915, at the seaward end of the Hunter Valley Field, the Lithgow owners at once put in motion the first stages of a plan which culminated in 1928–30 in the migration of the industry from the valley. A new site for blast furnaces and steel plant was found at Port Kembla on the Illawarra Coalfield and, with the passing of Lithgow, Australia lost its only inland centre of heavy industry. All subsequent developments have occurred at or near tidewater and are an expression of coastal influences.

Lithgow's rise and fall belong to an early phase in the history of the industry and it had all but vanished from the scene in 1929. But the gap was more than filled by its Port Kembla successor, Australian Iron and Steel Ltd., which together with the Broken Hill Proprietary Company, Ltd.,[2] at

[1] The author, recently at Nuffield College, Oxford, is now a lecturer in the Faculty of Economics at the University of Sydney. For a fuller treatment of the subject, see his monograph 'Economic development of the Australian iron and steel industry,' Melbourne, Broken Hill Proprietary Company, Ltd., 1948.

[2] Usually referred to in Australia by its initials, "B.H.P."

Newcastle, carried Australian iron and steel production from the modest levels of the late twenties to the height reached on the eve of war in 1939 and surpassed in 1941–42, Australia's best production year to date.

In 1915 the Newcastle works of the B.H.P. came into production and the modern phase in the history of iron and steel smelting opened. The new

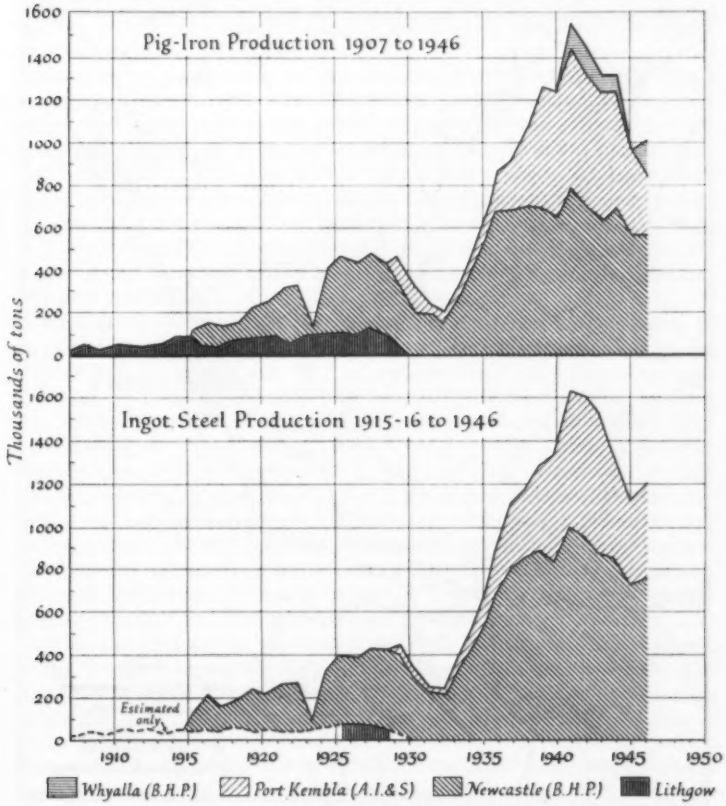


Figure 1

plant was planned on a large scale and built to American designs with large units and a highly rationalized layout. Iron ore, mined by open-cut methods in the very substantial Middleback Range deposits of South Australia, was shipped over 1500 miles of ocean to Newcastle. The ore was excellent, a 62 to 68 per cent. hematite very low in phosphorus, and thus without special problems for the blast furnace. Coal for the coke ovens was obtainable in abundance from collieries nearby and the limestone flux was quarried on the northern coast of Tasmania. The choice of a tidewater location for the

plant emphasized the abiding need to reduce the costly rail transport of bulky raw materials to a minimum, a consideration which has always been of the first importance in the economics of Australian industry.

It is important to note that the decision to erect large and up-to-date iron and steel works somewhere in the Commonwealth had been arrived at several

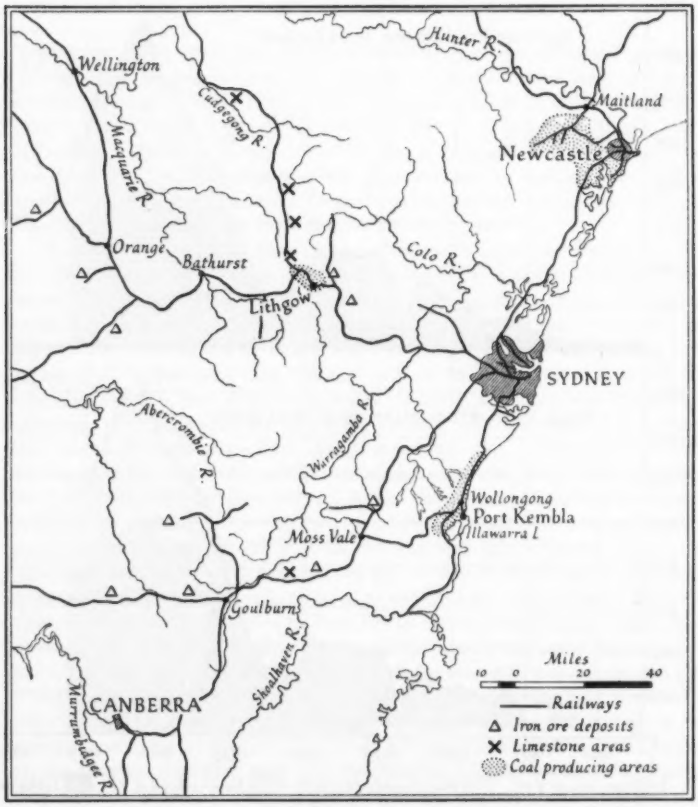


Figure 2

years before the outbreak of the First World War. Three major considerations weighed with the Company. It was plain that a large and ever growing demand for iron and steel existed in Australia and the Lithgow works then supplied only an insignificant fraction of the total demand; the country was dependent for the rest upon British, European, and to a less extent American exports. Secondly, the company possessed large deposits of high-grade iron ore in South Australia. It had come by these in 1899 during a search for a suitable flux for its silver-lead-zinc smelters at Port Pirie, though little

thought was given to the possibility of their use for smelting. After 1905 when the Company realized that there was a serious possibility of its silver-lead-zinc mines at Broken Hill giving out, it began to view the Iron Knob and Iron Monarch deposits in a new light. Feeling obliged to consider new avenues for the employment of its large accumulation of capital, built up since 1885 on the sale of silver, lead and zinc, it had tests carried out and the ore was found to be admirably suited in quality, quantity and location for use in a blast furnace.

Between 1910 and 1912, on the advice of David Baker, an American expert, the Company chose Newcastle for the site of the proposed plant. In recommending Newcastle, Baker had considered all the relevant factors: accessibility to markets, proximity of raw materials, availability of labour and costs of transport. He was confident that no other site in Australia could better meet these needs, and time has shown how eminently correct he was, for although other centres, most notably Port Kembla, have proved to be as well favoured as Newcastle for iron and steel production, none has yet surpassed it and Newcastle retains its priority amongst the continent's centres of heavy industry.

Work on the plant at Port Waratah on Newcastle harbour was begun in 1913 and the first phase of construction was nearing completion when the First World War broke out. The project soon assumed a heightened significance. Not only would it be able to supply a local armament industry but it would help to meet domestic needs which were bound to suffer from an increasing shortage of iron and steel in world markets. It was in this light that the Newcastle plant came to be regarded both before and after production began in March 1915. With an ever increasing local demand the industry prospered in a remarkable way for four years, and by 1919 Newcastle had established itself in the front line of Australia's new manufacturing regions. Iron and steel had become a tangible sign of the country's expanding economy. When the resumption of overseas imports in 1919, 1920, and 1921 threatened the local product, the Federal Government imposed a high protective tariff on iron and steel and it was behind this wall that the industry struggled in the 'twenties, contending with domestic costs which had risen since 1915 out of all proportion to world costs. The industry at Newcastle did manage to stabilize itself during this period and even to expand its capacity in spite of sharp competition, not only from imports but also from Australian production, first at Lithgow and later at Port Kembla. It was during these difficult years that the controllers of the Australian industry realized that their only hope of survival lay in pushing technical rationalization to its utmost. On the mechanical side Newcastle soon left little to be desired and when the "terms of trade" turned in the industry's favour in the early 'thirties, the fruits of rationalization and technical efficiency were at once apparent; Australian costs rapidly fell below those of her former rivals and the fall was not merely due to the fall in value of the Australian pound.

The evolution of the industry in Australia before 1939 thus falls into three main phases—the phase of wartime establishment from 1915 to 1919 which was marked by great expansion and prosperity, a phase of consolidation and stabilization during the 'twenties and, in the 'thirties, a phase characterized by

a renewed expansion which took advantage of the sound technical foundations laid in earlier years as well as the changed world economic position.

By 1939 very substantial developments had occurred in both the organization and the technical structure of the industry. Vertical integration had been pushed almost to its limits; indeed a preference for this type of organization had been openly expressed from the beginning, and was favoured by the Company's possession of what later proved to be Australia's largest and richest iron ore deposit. During and immediately after the First World War the Company had pushed ahead with the establishment of subsidiary industries, sometimes acting alone and sometimes in association with British firms, thereby assuring a market for a large part of its output. The establishment of its fleet of ships during the 'twenties gradually gave the Company its own line of communications. An important beginning was made to secure coal mines close to the steelworks, for in its early phase Newcastle had been sorely tried by the policies of Hunter Valley coal owners, and the Company is to-day the largest single coal producer in the country, with a capacity of 2·2 million tons from its four collieries in the lower Hunter Valley.[1]

Australian Iron and Steel Ltd., which had established the Port Kembla plant on the eve of the 1930–33 Depression, never fully recovered from its blighting effects and in 1935 became a subsidiary of B.H.P. Control of the two plants was unified under one board of directors, but each plant retained its own management. Expansion at Port Kembla was now resumed and by 1939 the plant had a productive capacity roughly two-thirds that of Newcastle. The Port Kembla plant, being newer, was in some respects in advance of Newcastle, especially in the matter of individual units, and at one stage could boast the largest blast furnace in the British Empire, with a rated daily capacity of 1200 tons of pig iron.

The factors which favoured the location of blast furnaces and a steel plant at Port Kembla resembled very closely those which had operated fifteen years earlier at Newcastle. Port Kembla is less than 10 miles from extensive coalfields and is a deep-sea port able to handle an import and export trade, and thus within economic radius of South Australian ore and the chief markets of Australia. In three other respects it is if anything more advantageously placed than Newcastle. Illawarra coal produces a better blast furnace coke, with the completion of the railway to Moss Vale it has access to an excellent deposit of limestone flux and there are large reserves of land adjacent to the site for future expansion. Newcastle is not at all well placed in this respect, having already occupied all the land immediately available.[2]

Thus by 1939 the Australian iron and steel industry had become concentrated on what are probably the two best sites in the country and was concentrated in the hands of a single Company. Given enlightened control, this makes for economy in capital investment, planned development, financial strength and a saving in some of the wastes which often accompany competition.

At the outbreak of the Second World War the Australian iron and steel

[1] The Company also owns collieries in the Illawara field.

[2] A new plan, ratified by the government in March 1950, will make more land available but will take some years to develop.

industry was in excellent shape to contribute to the war effort. The war potential of a nation is most readily reckoned in terms of its iron and steel capacity, and by this criterion Australia was infinitely better placed than in 1914. The Commonwealth was by 1940 rubbing shoulders, so to speak, with Canada, Belgium, Italy, and India. But in output per head of population Australia was well ahead of its rivals in this intermediate group of world producers, though it is true there was a big gap between them and the "big six" (the U.S.A., Soviet Russia, the United Kingdom, Germany, France, and Japan). It is not surprising that the war should have stimulated further expansion, and within eighteen months the production of pig iron increased from 1·24 million tons to 1·54 million in 1941, and of steel ingots from 1·26 million tons to 1·62 millions. The increase in pig iron was brought about

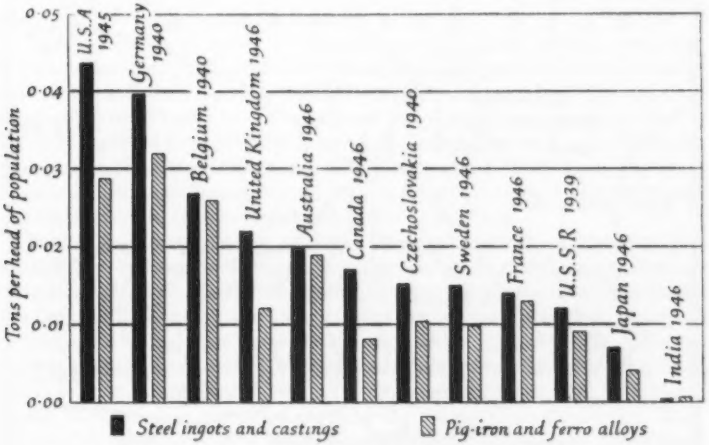


Fig. 3. Comparative production

partly by working the existing five blast furnaces more intensively but also by the bringing into production of a sixth furnace at Whyalla in South Australia. Steel output was raised by installing additional open-hearth furnaces which ultimately brought the number at Newcastle to fourteen and at Port Kembla to eight. The amount of iron and steel produced in 1941 still constitutes a record for the industry, for in that year Australia was in imminent danger of invasion. Conscious of the threat, Australians worked harder than ever before and in most industries output reached an all time peak. At the end of 1941 when the Japanese entered the war Australian industry was able, with American assistance, to stem the advance before it reached the Australian continent. When, towards the end of 1942, the Allies were able to mount an offensive, Australian steel and the armaments made from it contributed very substantially to the successes which redeemed the situation in 1943 and 1944. Wartime developments were many and varied. Ferro-alloys and tungsten carbide, not to mention a wide range of alloy steels, were made

for the first time so that, at the end of the war, the industry was even more highly integrated and self-sufficient than it had been in 1939.

Moreover the Broken Hill Proprietary Company had also established a third centre of iron smelting by the erection of a blast furnace at Whyalla. Here the Company also established its own ship-building yards, now the largest in Australia, and in so doing added yet another basic industry to the already impressive list of its activities.

Whyalla had been planned and partly established before the outbreak of war although, unlike Newcastle, its development was in part inspired by a realization that war was imminent. Australian leaders, political and industrial, had become increasingly aware of the danger of concentrating industry on

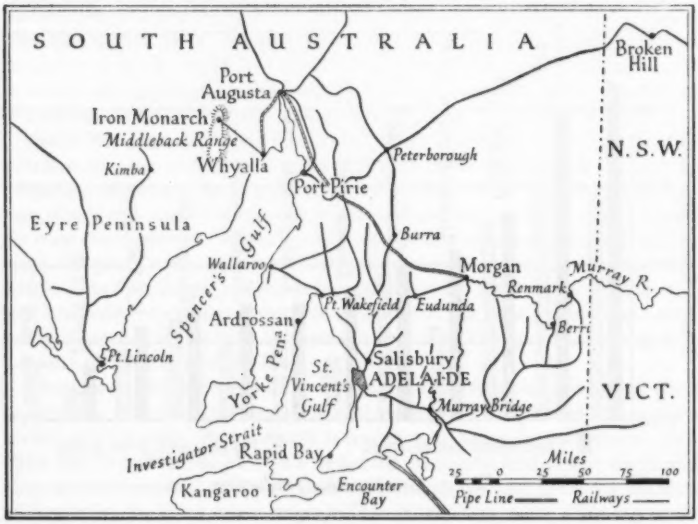


Figure 4

the exposed east coast and there was much to recommend the development of iron smelting at a more remote site. Whyalla was the only site which offered not only relative safety but also economic stability, for it is on the edge of the Middleback iron ore deposit for which it had already become the port of shipment. Iron smelting could thus be carried on economically and, at a later date, possibly steel smelting and steel rolling also. Coke or coal would have to be shipped from the east coast, for there are no suitable deposits of bituminous coal in South Australia. This might have seemed a critical disadvantage but by 1937 it had lost much of its earlier significance, following great improvements in blast furnace fuel efficiency.

Whyalla was not a mere response to defence strategy; its development into something more than an entrepôt for iron ore was greatly desired by the Government of South Australia which felt that the Company should con-

tribute something to the development of heavy industry in that state. It says much for the Company that its managers saw the wisdom of extending the industry more widely in Australia and, by the terms of an agreement signed with the Government of South Australia in 1937, it undertook to establish a blast furnace at Whyalla. It was soon decided to build ships there as well. Under the stimulus of war both projects were brought to completion in 1941.

A number of problems arose which had not been encountered on the east coast. The first and most fundamental was that of water supply, for Whyalla lies on the fringe of the Australian desert and receives less than 11 inches of rain in a normal year. Accordingly, the Government of South Australia undertook an ambitious scheme to pump water from the Murray river at Morgan, 223 miles away to the north-west, and by 1944 this work had been completed. Irrigation has thus redeemed yet another fragment of Australia's vast arid frontier, this time for industry.

An adequate labour supply for the new plants presented a further problem, but this was largely overcome by building a model town in which workers find all the amenities associated with a high standard of living. The pleasing appearance of Whyalla to-day is entirely the work of the Company which has even installed a model dairy to meet the demand for fresh milk. Working people from the eastern States, and from other parts of South Australia, were attracted to the town during the war years and the population had grown from twelve hundred in 1939 to eight thousand in 1946.

To-day the Australian iron and steel industry stands on the brink of yet another phase of expansion. There has, it is true, been a slackening of effort on the part of labour since 1945, and the output from blast furnaces and steel mills has declined from the high levels reached in the war years; but there has been no reduction in the capacity of the industry which has even been raised in several important respects. Without an adequate labour force however and starved of coal from its own mines, largely through labour troubles, it has been unable to maintain an output at anything like the capacity of the plant. The period 1945–50 is likely to be remembered chiefly for these labour difficulties, and frustration in the face of increasing demands for iron and steel not only from domestic consumers but from buyers overseas. It remains to be seen whether the nineteen fifties will see this crippling handicap removed.

One of the great advantages possessed by the Australian iron and steel industry, and one it has retained in spite of chronic underproduction and rising labour costs, is its extraordinarily low costs of production. Fig. 5 shows the wide margin of advantage enjoyed by several of the industry's products when compared with the same articles in the United Kingdom and the United States. More significantly, costs in the Australian industry have risen less rapidly than those overseas so that the industry is, if anything, in a stronger position than it was before and during the war. This low cost structure is of special significance for the engineering trades which have not, in the matter of costs, yet attained that happy position and whose place in the Australian economy has been rendered more tenable by the existence of a local supply of cheap steel.

Australian prices, which have of late attracted the attention of the iron and steel world, suggest and encourage the development of an export industry.

Export, in not insignificant quantities, had in fact begun in the later 'thirties, when the rapidly falling price opened up markets in New Zealand, Malaya, and the Netherlands Indies, in short in those areas where Australia is at a geographical advantage. The expansion of these markets (with the exception of New Zealand) was cut short by the war but they came to life again in 1945–46 when the demand for steel for rebuilding devastated areas in South-east Asia brought a sudden rush of orders, and it is a matter of considerable disappointment that only a fraction of this huge demand can at present be met. Home demands, larger than ever before and rapidly increasing, must be served first and leave only a small residue for the foreign market. It has been claimed that the industry could at the present time dispose without

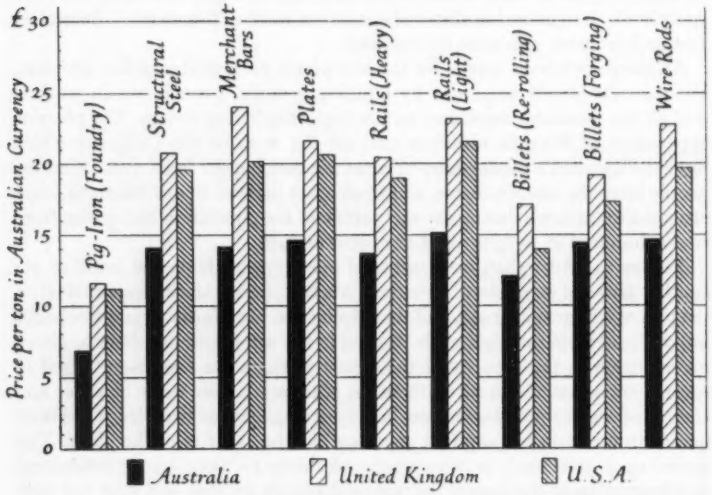


Fig. 5. Comparative prices, August to October 1947

difficulty of 4,000,000 tons of steel; half on the home market and half abroad. To achieve this position however the existing capacity would have to be more than doubled and production raised four times above the present level. While an expansion of this order would throw no strain on the supply of raw materials, it would certainly demand a bigger labour force, especially so in the Australian coal industry, which is not only seriously undermanned but in certain sections opposed to mechanization.

Nevertheless it is obvious that, in spite of such human obstacles, the industry must and will continue to expand. It is more a question of how long the required expansion is likely to take, and whether it can be carried through while the industry's costs of production, and the terms of trade generally, are so strongly in Australia's favour. Coal reserves in the Hunter valley and in the Illawarra are vast, measured against the forseeable future needs of Australian industry, and there are large reserves elsewhere in New South

Wales and in Queensland. The existing shortage of fuel is not so much a shortage of coal as a shortage of miners and mines. Nor is there a shortage of high-grade iron ore. Australia has, in the Middleback deposits near Whyalla, at least 200,000,000 tons of 62 to 68 per cent. hematite in sight and above ground, and it is not improbable that the existing hills of ore conceal substantial sub-surface deposits. In the north of Western Australia the industry has another major ore reserve. Like the Middleback ore it too is a 60 to 70 per cent. hematite and very low in impurities. The ore occurs on three islands in Yampi Sound (Koolan, Cockatoo, and Irvine), and about

Figure 6

100,000,000 tons are in sight. The value of this deposit is greatly enhanced by its outcropping very close to tidewater. Broken Hill Proprietary is now working the ore on Cockatoo Island, which it is intended to carry in ships specially constructed for the purpose to the east coast blast furnaces for blending with South Australian ore. The first of these vessels, *S.S. Iron Yampi* and *S.S. Iron Kimberley* were built at Whyalla and are now in commission, the largest ships yet built in Australia.

The present emphasis in the Australian industry is thus on expansion. With bountiful and almost unrivalled raw materials, a plant second to none, technical skill, the lowest production costs and selling price in the world and markets on all sides, the industry's sails are full set and waiting to catch

the wind. But progress will be slow until the manpower problem is solved. Most Australians hope that the crisis will have been passed by 1955. If such should prove the case, it is reasonable to forecast that by 1960 Australia will have become, not only the second largest producer of pig iron and steel in the British Commonwealth, but possibly the largest producer in the Western Pacific.

A FURTHER NOTE ON FREDERIK HENDRIK ISLAND

E. R. INGLIS

IN JUNE 1944, with a patrol of six members of the Royal Australian Engineers, I crossed Frederik Hendrik Island, off the south-west coast of New Guinea, from Kimaam to Soeam and back to obtain technical data on possible sites for air-strips reported by an earlier patrol. I can perhaps claim to be the only person who has both traversed the surface of the island and seen it from the air.

The journey from Kimaam to Soeam by canoe followed an unsuccessful attempt to carry out our task by reaching the air-strip sites near Soeam by launch from the eastern and northern coasts of the island and by dinghy up the Nangette Creek. The journey along the Nangette Creek ended where it broadens out into the shallow swamp which covers so much of the island and gives way in turn to alternations of rain-forest, dense jungle undergrowth and further areas of swamp. We continued on foot, four hours of unremitting struggle without any other loads than our fire-arms and a little food. We were without native aid at this time, nor had we any means of contacting the natives at Soeam. It was therefore thought impossible to transport our stores and survey equipment and leave sufficient time to carry out the necessary observations while adhering to either of our alternative pre-arranged times of meeting with the launch for the return journey. Reluctantly therefore we contented ourselves with recording our march by compass bearing and pacing. Our subsequent return to the sea was recorded by compass bearing and distance estimation. A plot of this journey subsequently disclosed that while the creek meandered for 3 miles before losing itself in the swamp, the air-strip sites were only about 2 miles inland from this point and only about 4 miles from the coast in a direct line.

Tidal influence was still great at the head of the creek; from an average of 18 feet at the sea, the tidal range decreased to 6 feet at this point. Our return journey was complicated in its timing by the tidal eccentricities, for the launch could not stand out to sea in war-time and our alternative rendezvous were for high tide on certain fixed dates. Progress in the dinghy averaged half a mile an hour, because of the number of fallen trees in the creek at all levels, and we had made part of the journey down the previous day, camping on an isolated patch of ground in the mangrove swamp above high tide level. Mr. Guertjens'

description of such creeks as "appearing to be mighty rivers at flood tide during the dry season; at low water shrinking to insignificant ditches enclosed between high walls of mud" [1] is both accurate and picturesque. He might have added that at low water they are the very embodiment of desolation.

This part of the patrol provided one answer at least; the possibility of making a road from the air-strip site to the sea was nil. Even had there been any rock outcrop or gravel formation, the engineering difficulties of traversing first the mangrove swamp immediately inland from the sea, and later the reedy swamps of the interior, rendered it out of the question, particularly when the consideration of speed in warfare was given due weight.

Our objective was finally reached by enlisting native paddlers with their canoes at Kimaam, and after three and a half days paddling, we reached the air-strip sites. It is at this point that I am in disagreement with Mr. Guertjens. He writes of the "higher-lying forests" to which the inhabitants migrate when the level of the water in the villages rises to a dangerous degree. From my experience, which was restricted to the northern half of the island, the forest area was semi-marshy at least. In June, as Mr. Guertjens has stated, the level of the water on the swamps is receding, yet we found these forest areas quite boggy. With the inevitable rising of the water-table when the swamps were full, this land would, I imagine, provide poor refuge for the inhabitants. Such areas as we found to be highest were clear of trees and covered by low, tussocky

[1] *Geogr. J.* 81 (1933) 435–8.

grass and bushes of a maximum height of 4 feet. Some indication of the sparsity of these bushes can be gauged from the fact that twelve native paddlers cleared an area 4000 feet long by 300 feet wide in two days, thus enabling an aeroplane to land when I was flown in on a subsequent visit.

There were native shelters with small gardens on the fringe of the grassed strip though, at least when we were there, the gardens were completely untended and fruitless and the shelters uninhabited. The soil on this higher ground was quite different from the black marl-like soil in the forest areas adjoining. On the open ground it was light in colour and friable for a depth of up to 18 inches. It is doubtful whether this land would ever become water-logged unless inundated. While only 4–6 feet higher than the level of the swamp water adjoining, it had no appearance of having been submerged at any time, and had not been in the memories of those natives whom we interrogated. But not more than 3 or 4 square miles of such land was found by either of the two patrols.

Mr. Francis Chichester who flew across the island in July 1931 described raised strips of land of uniform width separated by what seemed to be parallel drains and cross channels, the whole highly suggestive of former cultivation. His note [1] is illustrated by a photograph taken from the air. Mr. Guertjens who had traversed it on foot threw doubt on the reality of these indications of cultivation. The most serious disagreement between these two observers concerns the former's interpretation of the photograph, which shows a large area "laid out in raised strips of uniform width with what appeared like deep drains between. At intervals deeper cross drains cut through at right angles . . . seeming to show that at some time there had been extensive operations of agriculture." Mr. Guertjens saw no evidence of it in his journeys through the island, nor did he believe the natives capable of any planned agriculture. He asserts that they are extremely primitive, not having in fact reached the stone age. Stones, as he remarks, are completely unknown on the island.

From a close study of aerial photographs taken some two months after my visits, one of which is here reproduced, and having combined the land view of Mr. Guertjens and the aerial view of Mr. Chichester, I am in the position of the destructive critic who cannot produce an indisputable alternative, but who disagrees with the conclusion of each.

It is apparent from the photographs that Mr. Guertjens' conjecture that the signs of extensive agriculture are in fact canoe lanes, or possibly the lines of grass burnt under a prevailing wind, can be discounted. The canoe lanes show quite distinctly in the photograph, easily recognizable by anyone who has used them or who has heard or read a description of them. The burnt grass does not show so clearly, but is identifiable to one familiar with photo-interpretation. More important still, the roughly geometric designs of these mysterious lines show as distinct entities, not to be confused with either canoe lanes or burnt grass. Three experts in photo-interpretation, none with a prior knowledge of this island but all with long experience of photographic work in the Pacific area, have separately stated that the lines suggest rice-fields.

Yet despite the widespread incidence of the serried line areas over the portion of Frederik Hendrik which was photographed, none of the occupants

[1] *Geogr. J.* 80 (1932) 520–21.

Photo. Royal Australian Air Force, copyright reserved

Unexplained surface markings south of Sabadoeam, Frederik Hendrik Island, vertical photograph from 17,000 feet

of the aircraft saw any sign of them from the air. The experts expressed no great surprise at this for it is quite common for features of a grass-covered stretch of plain, not discernible from the air or on the surface, to show in an aerial photograph.

This leads me to advance a possible solution. Mr. Guertjens is correct in describing the natives as primitive, but I have a higher opinion than he of their ability in some directions. They are not very industrious by nature or temperament, but from sheer necessity have carried out a mammoth task in building up the series of small mounds in the swamp which form the sites of their villages. This has all been done with no other implement than a chisel-pointed stick. It seems possible that a system of drains had been developed from a conceived necessity to facilitate the drainage of the higher portions of swamp at the onset of the dry season; the land so reclaimed could become a hunting ground for wallabies. Neglecting the ability of the camera to pick up ground formations not visible to the unaided eye, the water may have been lower when Mr. Chichester made his flight than when we were there. Certainly it was a month later in the season. The 1944 photographs were taken two months after our visit: the two months were certainly dry, and no doubt the level of the water had again receded considerably.

There is another point which lends colour to the "drainage" theory. The natives belong to the same group as those living on the adjacent mainland, and we learnt to respect the mainland native's judgment when providing drains to protect army installations in the flat marshy country in and around Merauke.

We inquired at some length as to native habits, from the natives themselves and from the Javanese teacher resident in each of the villages visited. Nowhere did we hear of anything suggestive of large-scale agriculture; their main sources of food are as described by Mr. Guertjens. Why areas so extensive in the aggregate should have been drained is highly speculative. The only gardens noted by us were extremely small and on land not subject to inundation, and it is difficult to imagine that any form of cultivation, not known to Mr. Guertjens or perceived by us in any way, should cover so wide an area unless plots, small in themselves, were successively drained and used only for limited periods. The ridges and troughs would remain for a long time for, because of the reeds, there would be no wave action on the water which covers them each wet season. Such shifting cultivation is a characteristic of the natives of New Guinea.

But I find it difficult to believe that any of the practices I have suggested are current on Frederik Hendrik Island. They may have been current some years before, but why, if they are still in use, did they not come to the notice of Mr. Guertjens and to a lesser extent to us? It does seem reasonably certain that the puzzling lines on the photographs represent signs of man's activity, although probably not strictly agricultural.

One further point on which I must differ from Mr. Guertjens is the use of canoe lanes as footpaths in the dry season. From our talks with the natives (we were there towards the end of the wet season only) it appears that the footpaths kept to the fringes of the swamp as far as possible. This seems logical, as does the location of the canoe lanes where the water is deepest.

Such an arrangement would make for a maximum mobility under all conditions. Canoe lanes could, so the natives informed us, be used as paths only when the water was unusually low.

As the accompanying map shows, the area traversed by our patrol is not necessarily representative of the whole island. This leaves some room for doubt in accepting these conclusions; on the other hand the sweep made by air covered a much greater area. As the flight was in the nature of a further reconnaissance, the terrain was observed closely and photographs which I have subsequently had an opportunity of studying cover almost all of the island, though unfortunately not the air-strip site near Soeam. Conditions seem to be almost uniform, except that the southern coast is even more swampy and desolate than the remainder.

Life on the island has obviously advanced since Mr. Guertjens was there. Trade is now established at Kimaam; on being paid at the conclusion of our trip, the natives made off towards the Chinese trader to exchange their wealth for stick tobacco (for chewing), beads, and other trinkets.

We were told by the Dutch priest at Kimaam that he had pieced together the story of the settlement of this strange forbidding place. The people had migrated from the Digoel river area to free themselves from tyranny and plunder at the hands of more virile and warlike neighbouring tribes. This confirms Mr. Guertjens' suggestion that people first settled on the grassy higher ground, which we found to be relatively close to the sea. They were sought out by their old enemies and the one-sided battle continued. A further move inland took place and they established themselves as we found them, each village, except Kimaam, a miniature Venice of the Pacific. The population was estimated in 1943 at approximately 5000, a number which is now stationary after a decline in the last thirty years.

A WORLD LAND USE SURVEY

AT THE INTERNATIONAL Geographical Congress held at Lisbon in 1949 a proposal was brought forward for the institution of a world-wide survey or inventory of land use. A Commission was appointed to study the possibility of such a survey and to make proposals for its execution, its members being:

Dr. Samuel Van Valkenburg, Clark University, U.S.A. (Chairman).
Professor L. Dudley Stamp, University of London, England.
Dr. Hans Boesch, University of Zurich, Switzerland.
Dr. Pierre Gourou, University of Brussels, Belgium.
Dr. Leo Waibel, Conselho Nacional de Geografia, Brazil.

The Commission met at Worcester, Massachusetts, as guests of Clark University from 5 to 16 December 1949, and agreed on the following conclusion and proposals.

The world land use Survey

It recognized the urgency of the problems of world population and world food supply which are the concern in greater or less degree of all the countries of the world, and considered that present factual knowledge is inadequate to serve as a proper foundation for schemes of improvement and development, especially in those areas which are commonly regarded as "under-developed."

Many countries collect statistics of land use and agriculture, sometimes in very considerable detail and the Food and Agricultural Organization of the United Nations (F.A.O.) has also planned a comprehensive census of agriculture and land use, so that in the future many more statistics will be available. Various plans for soil surveys and detailed local surveys are also in hand, but it was not considered that these other plans in any way invalidated the need for the proposed land use survey; to which statistical material would be complementary. Only by recording the facts on maps can actual areas and distributions be shown and this is where the work of the World Land Use Survey will be both fundamental and unique.

Since all development or redevelopment must obviously start from the present position, the two immediate and prime essentials are an exact knowledge of the present position and, as far as possible, an understanding of the reasons for that position. For all parts of the world there should be a survey of land use together with an interpretation; this involves maps, embodying the survey, and explanatory memoirs. The emphasis is placed on maps because they show the actual location and distribution of varying types of land use, and any changes proposed will involve changes in the pattern of distribution shown on the map.

Of the many types of maps, some are purely factual and based on actual observations or survey, others are concerned with the interpretation or development of ideas, that is to say they are subjective. It is most important

to keep these two types separate and the first must precede the second. The Commission proposes a world organization under the auspices of the International Geographical Union to carry out the programme.

The first object of the Survey will be to record the present use of land in all parts of the world on a uniform system of classification and notation, with such amplification as may be locally necessary. The Survey will be carried out on the most appropriate scale available to secure accuracy and will be based essentially on field work, together with the interpretation of such material as air photographs.

The second object of the Survey is to secure the publication of the results. While it will not generally be possible to publish the detailed field maps unless this is undertaken by the countries concerned, the explanatory memoirs will include such details as are necessary for the understanding of the series of maps on the scale of 1 : 1,000,000, eventually to cover the world, which it is proposed to publish. This scale is selected because it is the only one on which maps for all the world are available,[1] and is sufficiently large to present the world picture. In their own detailed plans of development, individual countries and areas will obviously use the more detailed survey maps (they can be made available in microfilm or kodachrome slides). On the other hand, the 1/M map has the advantage of uniformity, permitting comparative studies, and is a convenient scale where large schemes of development are under consideration. On all the maps to be published the scale of the original surveys and the reliability of the information will be indicated.

The use of the Survey and the maps

Such a survey has many uses and, because it is definite and limited in scope, can be carried out in a short space of time.

The detailed survey of Britain for example, which was carried out before the Second World War, by indicating both ploughed land and land agriculturally submarginal (rough grazing), showed the areas where war-time expansion was possible or needed. Together with subsequent land classification studies, it was later used to indicate areas for the expansion of industry and housing and new town sites, in such a way as to cause least disturbance to the existing economy. Anomalies in land use—tracts under-developed when compared with neighbouring tracts—immediately stand out by contrasting colours on the map and call attention both to the problems and to the exact areas needing detailed investigation. Similar examples could be given from many other countries.

On the other hand, the absence of land use surveys in under-developed countries makes it impossible to formulate other than very generalized schemes of development. It is clear also that unless the present use of land is known and understood, development schemes may cut across the existing economic structure in such a way as to cause more harm than good.

[1] The International Map of the World 1 : 1,000,000 is scientifically accurate in that where precise surveys have not been carried out and the mapping is partly conjectural this is recorded on the sheet concerned. The International Map has not been issued for the whole world, but the 1 : 1,000,000 World Aeronautical Chart, published by the United States Coast and Geodetic Survey has.

Organization and Finance

A Permanent Commission, representing the International Geographical Union, should supervise the project, safeguard the consistency and quality of the work and arrange for training at Centres of Instruction. It should meet at least once a year at a Permanent Headquarters presided over by the Director of the World Land Use Survey. This office would advise the National Committees with respect to their part of the survey, assemble the finished surveys and memoirs, be in charge of the publication of the sheets of the 1/M map and edit and publish the memoirs, or approve the text before publication by other authorities.

When a country declared itself willing to participate it would appoint a committee or designate an agency to handle the work and correspond with the Permanent Headquarters. It is recognized that some parts of the world will need to be covered by special survey parties, organized by the Headquarters and collaborating with resident experts and local organizations.

With a view to securing a supply of properly trained geographers it will be desirable to have (in various parts of the world and especially at universities with strong geography departments) training courses for potential surveyors, to include such instruction as the interpretation of air photographs and the recognition of the various types of land use to be mapped.

It is hoped that National Committees will be able to carry out the work with funds provided locally, or otherwise available through existing channels. It is clear that the Headquarters cannot be established without a substantial grant and it is hoped that such a grant will be provided by one or more bodies with an active interest in the prosecution of research on a world-wide scale.

The classification of land use

Each country will decide after consultation with the Permanent Headquarters the scale to be used, but in general it is suggested that the larger the scale the better. Experience in several countries has shown that accurate delineation of areas is possible on 1-inch maps and, in some cases, on scales of 1 : 200,000 or 1 : 250,000. On the smaller scales some generalization is needed and the maps thus lose in accuracy.

In order to secure uniformity of presentation on the 1/M land use map a master key must be adopted. After very careful consideration of all the factors, the following classification of categories of land use to be recognized and mapped was drawn up by the Commission, which further explained and defined the categories in its report.

1. Settlements and associated non-agricultural lands (dark and light red).
2. Horticulture (deep purple).
3. Tree and other perennial crops (light purple).
4. Cropland
   (*a*) Continual and rotation cropping (dark brown).
   (*b*) Land rotation (light brown).
5. Improved permanent pasture (managed or enclosed) (light green).
6. Unimproved grazing land
   (*a*) Used (orange).
   (*b*) Not used (yellow).

7. Woodlands
   (*a*) Dense (dark green).
   (*b*) Open (medium green).
   (*c*) Scrub (olive green).
   (*d*) Swamp forests (blue green).
   (*r*) Cut-over or burnt-over forest areas (green stipple).
   (*f*) Forest with subsidiary cultivation (green with brown dots).
8. Swamps and marshes (non-forested) (blue).
9. Unproductive land (grey).

Conclusion

The Commission is aware that its report cannot be regarded as the conclusion of its work. It hopes to arrange for one or more pilot surveys to be carried out in order to test the validity of the conclusions so far reached before asking the International Geographical Union to sponsor a world-wide survey.

ISAIAH BOWMAN: AN APPRECIATION

A. G. OGILVIE

TIME MUST pass before a true estimate can be made of Bowman's influence upon geography and some of its applications; but no geographer will deny that it has been great and beneficial, and all who knew him will agree that it depended upon his intellectual gifts combined with immense energy and a convincing personality. Furthermore his great activity began at a time when the serious study of geography in America was tending to be confined within a few rather narrow channels; an influence leading to renewal was perhaps overdue. Again, his life coincided with a critical period of international affairs, in which he was called to play a notable part—probably far greater than that of any other geographer. There were great opportunities for a man of his calibre, and he rose to them fully.

Bowman's youthful experience of farm-life in Ontario and Michigan gave him an interest and, later, a real understanding of agricultural problems which no doubt influenced the systematic studies he was to initiate on the "pioneer fringe" of the world. It fell fortunately to Mark Jefferson at Ypsilanti to introduce him to geography; and Bowman's admiration for his teacher can be detected in the obituary he wrote shortly before his own death.[1] Jefferson's knowledge and appreciation of the European conception of geography must have been valuable to his pupil; and he in turn had an early opportunity of forming lasting friendships with European geographers during the two-months Transcontinental Excursion of the American Geographical Society in 1912. This was led by W. M. Davis who picked Bowman, then an assistant-professor at Yale, as one of the hosts. He had received a thorough training

[1] *Geogr. Rev.* 40 (1950) 134–7.

Phot. Kaiden-Kazanjian

Isaiah Bowman

under Davis at Harvard and might have devoted his career to geomorphology. He did in fact contribute greatly to this science. In 1911 he published a large textbook under the somewhat misleading title 'Forest physiography' which served for long as the best descriptive account of the relief, climate and soils of the United States, as related to the forests. But it was the central Andes which evoked his great talents for research in this field. The results of three journeys—two "Yale Expeditions" and one sponsored by the American Geographical Society (1913)—are described in several papers and two books: 'The Andes of southern Peru' (1916) and 'Desert trails of the Atacama' (1924). By these works Bowman demonstrated the value to an explorer of systematic training in geography for, while only very poor maps existed, he was able both to discover geographical relationships of all sorts and to convey their significance to the reader with great clarity. Moreover he showed that, despite the absence of stratigraphic evidence for long periods, a geological history of the Andes could be written from the interpretation of the surface. In 1921, Bowman was appointed by the U.S. Department of Justice to report, as a physiographic expert, on the Red River boundary which was hotly disputed between Texas and Oklahoma on account of the presence of an oilfield under the river-bed. After working on the ground during the summer vacation he made his report and gave evidence in the Supreme Court where the prolonged dispute was settled on the basis of his technical study of a changeable river.[1]

Bowman's name is known to laymen chiefly on account of his great services to his country, and to other nations, as a "political geographer." His book 'The New World: problems in political geography' was written after the settlement of 1919; with several editions, it reached a wide public and, in a world ridden by propaganda, the objectivity of the work was perhaps as valuable as its broad outlook and its well-selected information. Between the publication of this book and his brilliant address to this Society when he received the Patron's Medal in 1948,[2] he wrote, and spoke, on various aspects of political geography. The value of his published writings may thus be fully appreciated; but it is not yet possible to assess Bowman's influence, direct and indirect, upon international affairs during the last thirty years. It is certain however that no other man has applied so consistently and effectively the discipline of geography to difficult political and economic problems in war and uneasy peace. His knowledge and his gifts of judgment and organization were first employed by the U.S. Government when he was Chief Territorial Specialist on the American Commission to Negotiate Peace, during 1918 and 1919. Moreover during the Peace Conference these qualities were appreciated by members of other Delegations who realized that he had been largely responsible for the admirable American preparations, and who witnessed his work on various Territorial Commissions where patience was often sorely tried. From 1940 onwards he was deeply concerned in high policy, enjoying the confidence of President and Secretary of State, and attending numerous conferences. To quote Secretary Acheson, "he was a most effective and able collaborator with the United States Delegation in the San Francisco Conference. He was, in fact, one of the architects of the United Nations."

[1] *Geogr. Rev.* 13 (1923) 161–89. [2] *Geogr. J.* 112 (1948) 129–42.

Bowman was Director of the American Geographical Society from 1915 to 1935, and his main influence on geography was exerted in this capacity. The Council of that Society included men whose devotion to it led them to finance its conversion from a dignified "old-style" society to a new type of geographical institution; an excellent aim this, and one that our own, still older, Society has also pursued. The wisdom of the New York Council in 1915 is apparent first, from their choice of the Director and secondly, from their assurance to him of sufficient freedom to develop his plans during a period of twenty years. For much of the first three of these the house of the Society was the seat of "The Inquiry" inaugurated by Colonel House on behalf of President Wilson in preparation for the Peace Conference. Yet despite this feverish activity the monthly *Bulletin*, named *The Geographical Review* from 1916, was seen to be widened in scope and interest. With the Director's return from Paris the development of his plans began in earnest. With able support from the staff, reform and expansion took place in the Library and Map Collection. The *Review* soon became the valuable quarterly known since as a model to all geographers, and a separate editor was appointed for the special publications that were soon to multiply; a School of Survey was established, to be developed later as a Department of Technical Training. At the same time, having obtained promise of financial support, Bowman launched a programme of research into the geography of Hispanic America, with concurrent production of the 1/M map to cover the Western Hemisphere south of the Rio Grande in 100 sheets of standard equal to that of the International Map. For this ambitious project skilled cartographers had to be assembled, and a printer found; for no American firm had ever undertaken a task of this kind. Unfortunately the cost greatly exceeded the estimate and money became less easy to obtain; so the term, at first given as ten years, had to be extended greatly, while the plan of geographical handbooks to accompany the maps was abandoned when only one had appeared. Nevertheless when he retired, sixty sheets had been published and most of the remainder were well advanced. Disappointment at this delay in no wise curbed Bowman's optimism. All the time he was broadening the influence of the Society, initiating new programmes of research, electrifying his staff by his own enthusiasm and inducing scientists and scholars, specialists in many fields, to develop the geographic aspects of their specialisms. He had an almost uncanny instinct for finding good work which would lead either to a paper in the *Review* or to a special volume. Equally important in furthering research and publication was the well justified confidence given him by the benefactors and patrons of the Society. Bowman took care to keep in touch with the Fellows in New York by maintaining an interesting programme of evening lectures and by the issue of two attractive and excellent guide-books, 'Palisades Interstate Park'[1] and 'New York Walk Book.'[2] So, with the support of friends in New York, the Society was able to produce the long series of important books that have become indispensible to geographers, most of them either in the *Research Series* or the *Special Publications*.

The Society as developed in these ways came to be increasingly helpful to

[1] 1921, by R. L. Dickinson.

[2] 1923, by R. H. Torrey, F. Place and R. L. Dickinson.

individual scholars, explorers and travellers, and to cooperate in, or to send out, a number of expeditions whose results are recorded in its publications. Just as Bowman was a natural team-captain, so by his personality and prestige he invited collaboration from other learned societies and institutions. Appreciation of this is seen in his Presidency of the National Research Council and, later, of the American Association for the Advancement of Science, while his great reputation abroad brought him the Presidency of the International Geographical Union (1931–34). Tangible results of such collaboration are the 'Atlas of historical geography of the U.S.A.,' with the Carnegie Institution, and the works on pioneer settlement produced with the Social Science Research Council. This theme of the pioneer fringe occupied him very deeply. The American frontier was gone, he said, but the world, including his own country, was still filled with pioneer zones. He saw a natural laboratory for geography lying just beyond the margins of older occupation in all the continents, in those fringes that had recently become settled; and he noted that geographers had paid but little attention to these regions although they were the parts in which environment most conspicuously affected the lives of men. He outlined the problem in his presidential address to the Association of American Geographers in 1931, entitled "Planning in pioneer settlement", [1] and developed it in 'The pioneer fringe' published in the same year by the Society. To work himself into the problem, he spent a vacation studying Garfield County, Montana, and wrote an excellent regional study of it.[2] The whole series of papers and books by many writers on pioneer settlement throughout the world is a monument to his powerful impetus.

Bowman was a great advocate for geography in America. He demonstrated its nature not as a rule by theoretical treatise, but by means of practical problems it could help to solve: witness his book 'Geography in relation to the social sciences' (1934), written for this purpose and by this method. When he accepted the Presidency of Johns Hopkins in 1935, geography had no place in that illustrious university, and he realized that, in a period of necessary retrenchment there, no new department could be established. However the war gave the opportunity, with the great demand for geographers and for the training of the Forces in some aspects of the subject. The President's manner of making the introduction must surely be unique. The first duty of the newly appointed geographers in 1943 was to conduct a seminar attended by a dozen Hopkins professors, distinguished in other fields, who are reported to have become enthusiasts for the new subject. This was the beginning of The Isaiah Bowman School of Geography for which he eventually raised a large endowment. This success at Baltimore seems to have had the effect of a trigger in many other universities that were without departments of geography, and these multiplied in the war-years. On the other hand the suppression of the chair of geography at Harvard, his *alma mater*, caused Bowman serious misgiving. He had come to believe that, despite the ebullition of academic geography, the science would not make real progress until a new type of institution emerged in some of the universities, such as would

[1] *Annals Assocn. Amer. Geographers*, 22 (1932) 93–107.
[2] "Jordan Country," *Geogr. Rev.* 21 (1931) 22–55.

promote scholarship of a higher order. Hence the School that bears his name aims at fundamental research; and it is staffed, significantly, by men who have each been trained in some other discipline as well as in geography.

If Bowman had remained in New York and had not been called upon to serve in the political field, unquestionably his personal contribution to geography would have been greater and, but for the war, certain schemes of cooperative research in which he was concerned might have been farther advanced. But his advice remained at the disposal of his successor, and his influence exerted through the Society cannot be regarded as ending with his Directorship. His greatest service, then, is to be measured by the prestige of the Society whose activities he developed and by the encouragement and guidance which have accrued thereby to geographers in America and throughout the world.

He never doubted the validity of the claim of geography to be a science, and he rated very highly the disciplinary value of its training. Yet he saw more clearly than most the risk geographers run of making a fetish of the methods they properly employ; since progress, he believed, is thus impeded. On the other hand he believed most firmly in the great need for a proper and ever increasing integration of geographical research with that pursued by the other natural and social sciences. To this view he lent his great gifts of exposition. His very wide knowledge, coupled with his felicitous use of language and allusion, made him an outstanding advocate; witness one of his last publications, "Geographical interpretations." [1] While he referred to this address—given at Rutgers University—as "rather rambling," it touches many of the chords which rang constantly in his mind; incidentally, it opens with a penetrating appreciation of the functions of geography in the replanning of Britain.

All his career was marked by the effort to see things whole, and for him vision led to action, which generally brought out his success in making others see likewise. More and more the aim of greater happiness for humanity came to underlie all his effort, so it is of great importance that his work should be continued by others, and especially that his achievements in promoting joint studies by related sciences should be recognized and developed.

[1] *Geogr. Rev.* 39 (1949) 355–70.

AN ENCYCLOPAEDIA OF THE DESERT ARAB

THE ARAB OF THE DESERT. By H. R. P. DICKSON. *London: Allen and Unwin*, 1949. 9¼×6¼ *inches; 648 pages; maps in pocket, diagrams, and illustrations.* 63*s*

"THERE IS A long sighing in Arabia." The old order is changing all too rapidly, making way for a new dispensation, as unattractive as it was inevitable, which threatens to absorb the individualism of the desert into the mass-produced civilization of the west. In the process, as we might say with Empedocles, "Great qualities are trodden down, and littleness united is become invincible." Colonel Dickson's book reads like an epitaph on a dying culture, to which European civilization owed so much in its development, including its religion and its alphabet. His portrait of the Arab of the Desert is definitely a period piece of the era preceding the Second World War; and it is a fair guess that, apart from some very casual references to the new oil industry of Kuwait, the bulk of the book was written before the war. Therein lies its great value to the student of Arabia.

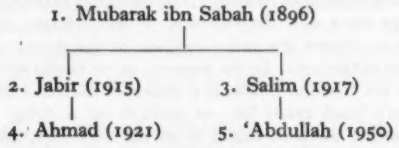
There are few Europeans, if indeed any, who know the Arab as well as Dickson. Many years ago I admired "the unstudied ease with which he fitted into an Arab setting"; and in a recent work I have referred to him as one "who in fact had a better knowledge of the situation developing in Eastern Arabia than all the others put together." Moreover, ever since those early days of the First World War in Mesopotamia when he began his long and unbroken connection with Arabia, he has always been a tireless and serious-minded student of the passing scene. The knowledge which he has so conscientiously collected during that period in his diaries and note-books is encyclopaedic. And now at last the world is permitted to share it in a volume of gigantic proportions (about 250,000 words) and of unusual type, to which it is not easy to do justice in the space of an ordinary review. In preparing it he has been greatly indebted to his wife and daughter, for whose contributions to the completeness of the picture we should be duly grateful. Their anonymous share in the exploration of Arabia deserves recognition at the highest level in the distinguished company of Lady Anne Blunt, Gertrude Bell, Doreen Ingrams, Freya Stark, and a few others.

Dickson makes no pretence at literary style, and apologizes charmingly for its absence. The volume is neither a travel-book nor a book of reminiscences: nor yet geography nor history: nor is it designed for continuous reading as a connected story. It is rather perhaps a sociological treatise, arranged on the lines of a reference-book or encyclopaedia, and dealing in forty-five chapters with almost every conceivable activity and interest of the Arabs. It is decidedly a book for the expert and student rather than the general reader; and inevitably the expert will find much to criticize, as well as much information of real value.

It is a pity that Dickson has not been tempted to give us an authoritative chapter on the discovery and development of oil, which within the last few years has made the Principality of Kuwait relatively the richest country in the world.

Another conspicuous omission in an otherwise encyclopaedic work is the lack of a chapter on the history of Kuwait during the two centuries of its rule by the Sabah dynasty, whose tenth representative on the throne, Shaikh Ahmad ibn

Jabir, died in January of this year after a reign of twenty-nine years, during which he was called upon to steer his State through the growing pains of its modernization. The accession of his first cousin, 'Abdullah ibn Salim, in preference to his own sons incidentally illustrates Dickson's remarks on the subject of succession (p. 117). In Arabia it is not the deceased ruler's eldest son but the most suitable member of the royal family who succeeds to the throne: the actual choice being determined by public acclamation, which alone binds the people to loyal service of the new, or prospective, ruler. This is well illustrated by the recent history of Kuwait, as shown in the following table:



Dickson is however quite wrong in supposing that there was a departure from Arab precedent or practice in Ibn Sa'ud's nomination of his son, the Amir Sa'ud, as his successor in 1933 (not 1930 as he states). The nomination was confirmed by public acclamation in the Great Mosque of Mecca after the Friday prayers, and the loyalty of the people was pledged to the Crown Prince as from that moment. Any act of disloyalty towards him thereafter would be high treason under the *Shar'* law. The ancient history of Arabia provides ample evidence of the association of a brother, son or nephew with the ruling king, not merely as heir presumptive but actually as joint king. In Najd both the king and the Amir Sa'ud are referred to by the royal designation of *Al Shuyukh:* a title which is not applicable to anyone else in the realm. It is in all conscience difficult to accept Dickson's allegation (p. 117) that the king ever said: "After my death, let the best man win." Such a remark would have been equivalent to the *après moi le déluge* of another famous monarch.

In general the treatment of the various subjects is somewhat slipshod, garrulous, vague, and often inconclusive. There are too many repetitions of trivial matter; and the punctilious dating and localization of gossip and hearsay evidence, with the names of his informants, is not of much use and is apt to be tedious. Space does not permit more than a few examples of such faults.

For instance, the rather elaborate scale of workmen's compensation (pp. 526–7) is implicitly attributed to the *Shar'* law, as communicated to Dickson "by H.E. the Shaikh of Kuwait on 5th April, 1936, who in turn obtained it from the Chief Qazi of Kuwait. . . ." Actually, as appears from the context, this scale was worked out to provide compensation for injury to the workmen of the Oil Company; and the best that can be said for it is that it is a quite modern application of *Shar'* principles.

Again, the story of the dead woman who nursed her child, "Recounted by Dhuwaihi bin Kharmit of the 'Awazim on 21st April, 1935, in camp at Malah" as an actual event which "happened in his father's time," has recently appeared in the more credible guise of a fairy tale in the best *Arabian Nights* manner in Major C. G. Campbell's excellent collection of 'Tales from the Arab tribes.' It is doubtless a familiar item of the story-teller's repertoire in the borderlands of 'Iraq.

Yet again, Dickson's chapter on the Meccan pilgrimage, though his information purports to have been derived from the Shaikh of Kuwait "on 8th January, 1941," is too slight and inaccurate in detail to be of use to "the uninitiated." He seems to confuse the boundary pillars (*'Alamain*) marking the

relatively small sacred territory round Mecca with the stations (*Miyaqit*) at which the pilgrim changes into the appropriate garments before proceeding towards the sacred limits. He appears also to think that the three "Devils" (*'Aqabat*) are enclosed by a single wall, whereas in fact they are several hundreds of yards apart. The "Great Devil" alone, as he rightly says, is stoned on the first day after the pilgrimage; but on the second and third days all three are stoned in turn, each with seven stones. The total number of stones cast by each pilgrim is thus forty-nine. Again the cutting of hair, paring of nails, etc., is only taboo when the pilgrim is actually in pilgrim garb (*Ihram*) and not, as Dickson states, between the 1st and 10th of the pilgrimage month. In some cases the minimum period may be less than 48 hours, while in others it may extend to a month or more.

As will be seen from the above, a book would be needed to do full justice to the contents of this immense and valuable labour of love, which is admirably illustrated by some excellent photographs and many first-class drawings and coloured plates. These, with the plans, sketches and maps in the cover pocket, will repay careful study. Colonel Dickson is to be congratulated on an outstanding contribution to our knowledge of The Arab of the Desert.

H. St.J. B. Philby.

UNITED STATES EXPLORATION IN THE ANTARCTIC

ANTARCTIC CONQUEST. By Commander Finn Ronne. *New York: Putnam,* 1949. $8\frac{1}{2}\times6$ *inches;* xx+299 *pages; maps and illustrations.* $5.00

This is the story of the Ronne Antarctic Research Expedition of 1946–48, written for the general public by the leader of the Expedition. It is the most detailed account so far published, and must be assessed as one of the series of books, records and narratives which together make up the history of Antarctic exploration. It is indeed the only full account available to the public of an Antarctic expedition by any nation in the immediate post-war years.

The expedition, under the auspices of the American Geographical Society, was remarkably successful and, considering that it was in the Antarctic for less than twelve months, its accomplishments were considerable. A comprehensive programme of flying—some 346 hours in the air—and of air photography was carried out, which provided information and photographs of much new territory. In addition there was the regular and extensive scientific work of the meteorologists, physicists and geologists, all carried out under the difficulties inevitable in polar conditions.

The Ronne Antarctic Research Expedition established its base on Stonington Island in Marguerite Bay in southern Graham Land in March 1947, close to "Base E" of the Falkland Islands Dependencies Survey, already established there in February 1946. Earlier it had been widely realized that two expeditions based on the same small island might lead to difficulty and Ronne, referring to the fact that the British Ambassador in Washington had urged him before sailing to select another base of operations, seeks to justify his choice by pointing out that the U.S. Antarctic Service Expedition of 1939–41 (of which Ronne was himself a member) had built its base on Stonington Island. This

site was however within 4 miles of the British Graham Land Expedition's 1936–37 base on the Debenham Islands, to which a second expedition was to have returned [1] had it not been prevented by the political events of 1938. A similar situation might therefore have arisen in 1939.

Outstanding in the expedition's accomplishments were the flights of the "Beechcraft" and "Norseman" aircraft to the southern parts of the Weddell Sea, revealing for the first time the approximate position of the hitherto unknown and unapproachable south-western limit of that sea. It was a fortunate and helpful coincidence that these flights should have been made in a season of much open water, so that no doubt remained about the northern limit of the shelf ice. No landings were made in this particular area, but there seems little doubt that the shelf ice identified extended into the area of the Luitpold coast, thus closing by air-reconnaissance the 450-mile gap between the eastern coast line of the Weddell Sea, fixed in 1912 and 1915, and the western coast line, the mapping of which has been completed in the past five years. A further successful flight was made to the south-west of King George VI Sound and to Charcot Island. Ronne landed twice on the continent itself and obtained a sextant position line at his most southerly point in that area (lat. 74° S. and long. 80° W), where he estimated the altitude to be 3100 feet above sea-level. On this particular flight he flew beyond the range of wireless communication with his base, departed very considerably from his planned course and made two landings in unknown territory. The success of the moment had persuaded him to ignore his own stringent rules and to fly into new country without anyone having the least idea of where to search in case of accident.

Further flights were made to the north, and up the east and west coasts of Graham Land; on all the major flights trimetrogon photographs were taken, which furnish some of the excellent illustrations in the book. These photographs were taken for map making, but one must be severely critical of the accomplishments claimed in this respect. On page 151, Ronne says: "It was important to get astronomical ground-control points as far west and as far south as possible to locate these points accurately on the map for correlation with our aerial photographs, because a photograph by itself, however magnificent, tells nothing about the latitude and longitude of the place shown in the picture. And these things cannot be measured accurately enough from a speeding airplane." Yet throughout the book there is no reference to any surveying instrument, capable of determining astro-control points to the desired accuracy—say two or three seconds of arc, having been used on the ground by Ronne's party. The provision of adequate ground-control was however a feature of the fine sledge journey to the south-west corner of the Weddell Sea by a party of two members of Ronne's expedition and two members of the Falkland Islands Dependencies Survey led by Major Butler; and on that occasion the observations were made by the British surveyor, Captain Mason, using a Tavistock theodolite reading direct to one second of arc. With this in mind it is astonishing to find on page 255 the statement: "We had made 14,000 aerial photographs of this area, almost as big as Mexico, with ground-control points to make accurate mapping possible."

Ronne moreover has not confined his claim of original surveys to the south-west corner of the Weddell Sea. In the maps at page 230, and on the end-papers, we are led to assume, since no acknowledgments are made, that he was responsible for mapping the east coast of Graham Land north as well as south of latitude 69°. He did photograph the area, but by no stretch of imagination can

[1] See *Geogr. J.* 94 (1939) 256.

he claim to have had ground-control extending on the east coast to latitude 66° 15′ S. The line of this coast, claimed as the work of Ronne's expedition, bears a close resemblance to British Admiralty Chart No. 3196 (published 12 November 1948) which is based on the only controlled survey ever made of the area—by the ground survey parties of the Falkland Islands Dependencies Survey. The place names on this coast are also those given by Ronne, though he must have known that other names were being assigned by those who had actually made the survey.

'Antarctic Conquest,' despite its shortcomings, is a readable book, well printed and illustrated. It is a popular account that will appeal to the undiscerning, but to the discerning it will give the impression of a story of good work well done, but marred by trying to make the good work stretch far beyond its limits. It might indeed have been a first-class account of a worthy expedition instead of being, as it is, a mixture of good exploration and the ignoring of other mens' work.

One must no doubt take into account the author's frequently indicated desire to break Antarctic records, and in this light even his most far-fetched statements may perhaps be condoned. On page 288, speaking of the Falkland Islands Dependencies and of territorial claims in the Antarctic, he says: "It so happens my claim by virtue of discovery lies within, or overlaps, official claims previously made by Great Britain, Argentina and Chile. The fact remains however that American expeditions have done the 'original' exploration of practically the entire sector." If by exploration we mean "seeing for the first time" and photographing without necessarily knowing where one is, then Ronne's statement is partly true; for American expeditions in recent years have undoubtedly seen from the air a far greater area than all the British expeditions that have explored in the sector. If however we believe, as does the reviewer, that the word "explore" means studying a country and accurately fixing its position, then Ronne's claim is difficult to sustain. The total, in this latter sense, of all the exploration done by all the American expeditions in the sector cannot in any way compare with the detailed scientific reports, maps and charts produced by the many British expeditions from Smith's and Bransfield's time down to the work of the Falkland Islands Dependencies Survey whose effort has been continuous since 1943.

A. STEPHENSON

REVIEWS

EUROPE

THE EARLY ALPINE GUIDES. By RONALD CLARK. *London: Phoenix House*, 1949. $8\frac{1}{2} \times 6$ *inches; 208 pages; maps and illustrations.* 15*s*

There seems no halt to the spreading popularity of books on mountaineering, whether they describe our own hills or ranges overseas. On the Continent, too, books pour from the presses. It is not only climbing exploits that are described; the "mountaineering" novel is now relatively frequent and it was obvious that, with popular interest aroused, there would be a ready sale for the historical approach.

This is in itself no bad thing. It is good to remember the past while we cope with the present and plan for the future, for all is built on the past. In so far therefore as Mr. Clark succeeds in arousing interest among a wide public in the activities of the early alpine guides, he is rendering valuable service, but a simple rehash of earlier volumes, unaccompanied, one would imagine, by any personal experience of mountaineering and unrelated to later practice, is bound to disappoint. History is only really interesting in the popular sense of the word when it is connected; it is likely to be unsatisfying when an attempt is made to present it in an isolated chunk. When 'Pioneers of the Alps' was published the golden age of alpine climbing was only just over; modern techniques were in their infancy and new horizons yet barely discerned. In the sixty years that have passed we have been able to withdraw from the subject and gain perspective. It is a pity that full advantage has not been taken of this great opportunity.

If we switch our interest entirely to the past, as the author would have us do, it must be with something of an effort. The Alps are now so well known, so served with hotels, huts, paths and funiculars that it is difficult to remember that a hundred years ago the maps were no more reliable above the snow line than those of the Karakoram to-day. In those days *Geister*, the counterpart of the Abominable Snowman, lurked on glaciers and a pall of inaccessibility hung over what are now the most familiar peaks and passes. It was in such conditions that the early guides learnt and perfected their craft with the encouragement of their daring employers, which alone rendered their exploits possible. They were as much explorers as those who now visit unmapped ranges and the author pays due tribute to their courage and defiance of what was then considered dangerous if not impossible.

Mr. Clark has a facile pen and tells his story well but it remains, as he himself is careful to admit, another version of a thrice-told tale. After this lapse of time it was impossible for him to shed any more light than his predecessors, who failed lamentably in this respect, on the private lives and inner attitude of mind of these peasants, though he has found a happy simile in writing that the relation between guide and amateur was like that of a captain and sergeant in a commando unit. As already stated he makes no attempt to use his theme to illustrate the progress of mountaineering and guiding. It would have been fascinating if he had built up for us a comparison between the primitive days, the later guides and their successors of to-day. There is now more material to show what these men thought and felt and were. The reminiscences of Zurbriggen and Klucker are available and a comparison with the first volume of Armand Charlet's reminiscences, just published by Attinger, shows how little

in some respects guiding changed at Chamonix between 1850 and 1920. The old evils of the rota system still prevailed and there persisted the reluctance to visit other ranges or to speak other tongues.

In reviewing a popular work of this type it is perhaps captious to draw attention to misprints and inaccuracies but they are too numerous to pass without comment. The publishers begin with a solecism on the dust jacket where Lord Schuster is dubbed "G.C.B., K.C.B." and there are numerous misprints: Salienaz for Salenaz (p. 30); Zwillingejoch for Zwillingsjoch (p. 54); Peter Bohren becomes feminized as "Die Gletscher-Wolf" (p. 66) Blatière for Blaitière (p. 69); Gwrd for Gwryd (p. 84), etc.

Nevertheless this book, admirably illustrated with reproductions of contemporary photographs, enables the reader to evoke an almost forgotten age, the history of which is not now available to the general public in accessible form.

D. L. B.

MALTA: an account and an appreciation. By Sir HARRY LUKE. *London: George Harrap*, 1949. 9×6 *inches; 200 pages; illustrations. 15s*

Sir Harry Luke, who was Lieutenant Governor of Malta from 1930 to 1938, writes that his book is "not a history, not a collection of personal reminiscences, and above all not a commentary on Malta's politics." He could also have said that it is not a geography; in fact a first-class geography of the Maltese Islands still remains to be written. 'Malta' is a very readable introduction to Maltese history and present-day life on the island. There are chapters on the remote past and the wonderful works of neolithic man which exist to-day; on the coming of the Knights of St. John and the ways by which they strengthened their position on the island. There are also some delightful cameos on the relations between the Grand Master and the two rival authorities—the Bishop and the Grand Inquisitor. The author describes Valletta, the Three Cities, Mdina the old capital, and he writes with enthusiasm about the churches, palaces and works of art, some of which he was instrumental in restoring. Malta, since the time of the Knights has been a storehouse of art treasures, for the Religion, as the Order of St. John was known, was probably the most aristocratic body that ever flourished in the Roman Catholic Church. The Grand Master was a Sovereign Prince who corresponded on equal terms with the crowned heads of Europe, and who insisted on the best of everything, and this insistence caused skilled artists to come to Valletta, thereby enriching the island with tapestries, paintings, furniture and wonderful suits of armour. Although much of the gold, silver and precious stones was stolen by Napoleon and cast away when the French man-o'-war *L'Orient* was destroyed at the Battle of the Nile, most of the archives and other immovable treasures have remained. In the chapter entitled "What they thought of Malta," the author has gathered together the scattered writings of a number of illustrious Englishmen—Coleridge, Byron, Sir Walter Scott, Disraeli, Thackeray, Edward Lear—who recorded their impressions of the island. The name of John Henry Newman could perhaps have been found a place here; his letters and poems from Malta have recently been published and evoked great interest among the islanders. There is an interesting description of the neighbouring island of Gozo, where possibly more than anywhere else in Europe, a medieval atmosphere can be breathed. Also mentioned are the two smaller islands of Comino, where threshing is carried on as it was done in the days of St. John the Baptist, and Filfla, peace-time target for the Navy and the R.A.F. and the home of a wonderfully coloured lizard which still survives in spite of bombing and shelling.

Malta, which owes much to Sir Harry Luke for his loving care of some of its relics of the past, is further in his debt for this appreciative and well-illustrated account, which represents a notable addition to its rather scanty literature in English. E. C. B.

DIE SOWJETUNION. By WERNER LEIMBACH. *Stuttgart: Franckh'sche Verlagshandlung*, 1950. 8×5½ *inches; 526 pages; maps, diagrams and illustrations D.M.* 28

This is an invaluable compendium and far outstrips in scope and *expertise* anything of the kind known to this reviewer in English. It is equally useful as a guide to the basic resources and natural features of the U.S.S.R., raw materials, population, climate etc. and to political, economic and sociological aspects of the country such as its frontiers, religious groups, economic development (it includes a detailed examination of transport) and administrative divisions; there is even an appendix on the ministerial offices. The section on "Scientific Research and its Institutions" is specially worthy of note and contains *inter alia* an excellent appraisal of the more recent Soviet maps. All these subjects are treated with authority and show a masterly grasp of the available source material. The information produced is in step with the latest developments in the Soviet Union up to 1949.

The book is enhanced by a separate map in colour of the Soviet Union and a series of illustrations, charts and sketch-maps throw further light on remote areas and problems (especially economic development) needing more graphic description. There is in addition a complete name and subject index and indexes to the maps, charts and illustrations.

Dr. Leimbach's title 'Die Sowjetunion—Natur, Volk und Wirtschaft' may suggest a dry-as-dust textbook but in fact it introduces one of the most stimulating, omnicompetent and reliable works on Soviet Russia I have read. V. C.

LES RICHESSES DE LA FRANCE D'OUTRE-MER. By CHARLES ROBEQUAIN. *Paris: Payot*, 1949. 5½×9 *inches; 221 pages; maps and diagrams.* 480 *fr.*

This is another volume in the *Bibliothèque Géographique* to which Professor Robequain also contributed 'Le monde malais.' His latest book reviews in a concise and interesting way the problems of the French Empire. Written by the Professor of Colonial Geography at the Sorbonne it naturally has a geographical basis, yet it is designed for the general reader and has that ease of style and breadth of vision which we associate with French geographical writing. It is a matter for great regret that these qualities are so often missing in this country, a matter to which Mr. E. O. Giffard called attention in the *Journal* (114 (1949) 116–8).

Professor Robequain deals first with the variety and disposition of the colonies and then with the several aspects of economic development—agriculture, European settlement, stock-raising, fishing, forestry, mining, crafts and secondary industries; with the economic organization of the Empire and its external relationships. Such a method of treatment is much more interesting than that of taking each territory in turn, and provides valuable comparisons.

The contrast between French and British Colonial policies is well known, yet it is interesting to see French theories illuminated in this survey. Thus, the official title of the Empire is *La France d'Outre-Mer* or *l'Union Française*, whilst tropical Africa is referred to here, and in French writings generally, as *l'Afrique noire*. On page 137 Professor Robequain says that "c'est par la petite colonization qu'on a souvent espéré rattacher indissolublement à la France les

pays conquis." Throughout, the implication is that whatever happens all French territories *must* remain for ever in the French Union. This is an excellent study and a useful work of reference. R. J. H-C.

ASIA

INDIAN TRAVELS OF THEVENOT AND CARERI. Edited by SURENDRANATH SEN. (Indian Records Series.) *Delhi: National Archives of India*, 1949. $9\frac{3}{4} \times 7$ *inches;* lxvi+434 *pages; maps and illustrations.* 20*s*

Great credit should be given to the Government of India for having accepted in 1942 the recommendation of the Indian Historical Records Commission that publication of the Indian Records series should be renewed. The first fruits of that decision are now to be seen and, although the appearance and production of the book are far below the high standard set by John Murray who published the Records between 1905 and 1913, Mr. Surendranath Sen, Director of Archives to the Government of India, has done the work of editing very well and his introduction, which extends to about fifty pages, shows a wide knowledge of early travellers' accounts of India.

The published work of Jean de Thevenot is to be found without much difficulty in the shops of antiquarian booksellers and is one of the best of seventeenth-century travels. The Italian Careri, though he had considerable popularity in his day, is less known now and the present issue of part of his travels should stir Indian historians to try to identify the villages through which he passed on his way to the Kanheri caves and possibly to correct their views of the decline of Portuguese power in India. Like many early travellers, Careri was accused of romancing; he may have embroidered his tale or been a trifle boastful, but there is no question that much of what he writes has the stamp of personal experience and is of no small geographical value. Mr. Sen is right of course in saying that both Thevenot and Careri were indifferent geographers and no better as naturalists. That is to judge them by modern standards and does not in the least detract from the value of their work "where they record their personal experiences and write of the roads they traversed, the towns they visited, the men they met, the things they saw, the amenities they enjoyed, the discomforts they suffered and the difficulties they encountered." S. T. S.

WESTERN INDIA: a regional geography, with special reference to Gujarat, Maharashtra and Karnatak. By C. D. DESHPANDE. *Dharwar: Students' Own Book Depot*, 1948. $9\frac{3}{4} \times 6\frac{3}{4}$ *inches;* 276 *pages; maps*

Students of Indian geography have felt acutely the all but complete lack of regional monographs. Mr. Deshpande makes but a modest claim for his book —it is "an outline survey" only—but it is nonetheless a notable contribution. For the first time we have a large area of India (Bombay, and Saurashtra) studied on the scale to which we are accustomed in the West; an area usually treated in four or five major regions is here broken down into some forty, with a number of *pays* as well.

There are two criticisms of some importance. Methodologically the attempt to establish the status of the area as a "region" is unsuccessful; it would have been better simply to accept the arbitrary eastern boundaries. Typographically the book is very badly done; the reviewer's corrections average three or four to a page. Allowance must of course be made for a local printer probably not at home in any technical jargon but those of religion and politics; but it is to be hoped that Mr. Deshpande may find better printers for the second edition

which is on several counts desirable. The omission of dates in the references also calls for correction.

But the work, by and large, is more than competent. Mr. Deshpande knows his sources, but is not a blind follower of them; in many cases he has obviously first-hand knowledge. The pattern is the standard one: general background, a regional section (about half the volume), and an economic and administrative summary. Of these the first and the last are very useful surveys of an important area, but it is the regional core which is especially valuable. The Karnatak is Mr. Deshpande's home ground, but at the other end of his area he gives an extremely clear picture of the fascinating but little-known country of Kathiawar and Cutch. The western geographer will find much detail that is quite new to him, or, if known, not well apprehended owing to its fragmentation through a host of unequally useful sources; and the constant emphasis on historical and cultural relationships gives life and vividness to the physical facts. Indian geographers in their turn may well find in Mr. Deshpande's work a stimulus and an example. O. H. K. S.

AFRICA

BAKER OF THE NILE. By DOROTHY MIDDLETON. *London: The Falcon Press*, 1949. $8\frac{3}{4} \times 6$ *inches;* 280 *pages; maps and illustrations.* 13*s* 6*d*

Mrs. Middleton has written a very readable account of one of the great explorers of Africa who was also one of the great British pioneers in the second half of the last century. This is primarily a book about the man himself. The author's foreword begins: "I have made no attempt in this life of Samuel White Baker to assess his importance as a geographer and explorer or to settle him into any particular niche of Victorian fame." This need not, and should not, cause geographers to put the book aside. They will find an old story retold with freshness, humour, sympathy, and a nice sense of proportion. In telling it the author has had the advantage of access to private papers and unpublished documents though most of her facts are drawn from the published works of Baker.

Sir Samuel Baker was described by his enemies as "a distinguished filibuster." How far from the truth this was is well illustrated in this book. "He was a practical and not over-sensitive Englishman of the prosperous middle class, pretty well satisfied with things as he found them—white and black, rich and poor, rulers and ruled. But in one particular matter he felt exactly as Livingstone felt—when he saw with his own intelligent eyes the bestial cruelties of the slave trade, he knew without a doubt that it must cease . . ." That is perhaps his "niche of Victorian fame." Long after he had served Africa so well the natives of Unyoro said of him "when he fought he was always in front; when he fired he never missed; if we did not obey orders he shook us: then our teeth dropped out." Such was the man who tried, but failed, to deal effectively with the slave trade. His efforts here and his other activities, are faithfully recorded in this pleasing book. J. N. L. B.

AMERICA

THE COLONIAL CIVILIZATION OF NORTH AMERICA. By LOUIS B. WRIGHT. *London: Eyre and Spottiswoode*, 1949. $8\frac{3}{4} \times 5\frac{3}{4}$ *inches;* viii + 303 *pages; illustrations.* 18*s*

The subject of the Historical Geography of the United States has long received attention from geographers and to the earlier works of Brigham, Semple, and Turner has recently been added the "outstanding contribution" of R. H.

Brown (*Geogr. J.* 112 (1948) 232). It is no criticism of these works to say that Professor Wright's book cannot be neglected by any student of the subject. He "seeks to interpret the political, social, and intellectual development of the colonies in regional groups" and gives particular attention to the early history of each. Five chapters deal respectively with the Chesapeake Bay colonies, New England, the Hudson and Delaware, Pennsylvania, and Carolina and Georgia. A sixth surveys the colonies as a whole in the eighteenth century, and the book is introduced by a valuable essay by the Master of St. John's College, Cambridge, on the setting of the Colonial movement in England.

It is difficult in a short notice to do justice to the wealth of good things in these pages. In the making of new homes in a new world the environment (in its widest sense) of the old world was important. This is well shown in New England where the Puritans gave new emphasis and direction to "the bourgeois ethics which had been preached for generations by middle class Englishmen." "Their religion, seeming so cheerless, was a strength and an asset in the mundane affairs of trade and commerce." In Virginia a different set of circumstances and of people produced a different result. In 1612 John Rolfe "produced and cured a crop of tobacco palatable to European tastes." This not only gave prosperity to the Colony but required increasing amounts of "fresh and fertile" land, and the planters quickly "scattered up and down the numerous waterways until they were scattered over most of the tidewater." Such settlement produced no town but it attracted many indentured servants who in turn became landowners. And when the coastal areas became exhausted the back country, in the eighteenth century, brought economic salvation alike to distressed farmers and to new settlers.

The introduction of rice into Carolina by John Thurber about 1685 eventually "transformed the agricultural economy of the Colony." How physical geography, disease, and social tastes blended in that development is excellently described (pp. 216–7). Second only to rice as a money crop from 1750 until the Revolution was indigo, the profitable cultivation of which owed everything to the remarkable efforts of a girl, Eliza Lucas.

This book is both an example to those who belittle the importance of man as a geographical agent and a warning to those who plan his future. What the promoters of colonies expected the settlers to do in many cases bore no relation to what was practicable. "For a long time armchair economists insisted that Virginia would be a source for raw silk if silkworm culture could be introduced. With inexhaustable forests to supply fuel, they also believed that iron smelters and glass works ought to flourish. To that end the Company sent to Virginia a few skilled workers who actually produced both glass and iron in small quantities but never at a profit" (p. 34). So later, Azilia (Georgia) was written up to such an extent that "Paradise with all her virgin beauties may be modestly supposed at most but equal to its native excellencies." These last were supposed to be capable of producing "dates, figs, olives, currants, almonds, coffee, silk, and sundry other exotic commodities" (p. 236). Most remarkable of all was the "Proclamation Line" of 1763 by which the Board of Trade attempted to set up an Indian reserve and so stop all westward expansion. White settlers already in the area marked out were required to leave. The line "succeeded merely in providing one more grievance of the colonies against the home government" (p. 261).

The book is illustrated by a number of reproductions of prints and maps but there is no modern map. This makes it difficult to follow the details of some of the text, but its absence is a small fault in a splendid book. J. N. L. B.

THE NORSE DISCOVERIES AND EXPLORATIONS IN AMERICA. By EDWARD REMAN. *Los Angeles: University of California Press*, 1949. $8\frac{3}{4} \times 5\frac{1}{2}$ *inches;* xiii + 201 *pages; map.* 26*s*

This book is an important study of the problems raised by the locations in the sagas of Eric the Red, Leif Ericsson, Thorfinn Karlsefni and Thorwald Ericsson. The sagas are all quoted here and a careful comparison is made between the Icelandic versions of the stories and the Greenland versions preserved in other Icelandic manuscripts.

The evidence that Leif founded his settlement of Leifsbudir on the mainland shore of the Bay of Fundy is based on a very full and exhaustive discussion of the geographical material in the saga; the best that has yet been published. The two minor errors which the reviewer was able to detect in this part of the text, were really confirmations of the author's theory. First he does not believe in the "self-sown wheat" mentioned in the sagas. The fact is that until recent times all the aboriginal tribes of this part of North America spent some of the late summer gathering the seeds of the wild-rice grass. The Norsemen could hardly have failed to realize that this grass was rather like the rye and barley to which they were more accustomed than wheat. Secondly the author is rather puzzled by the passages which say that Leif put to sea in a north-east wind, from some point on the west side of Newfoundland (Markland). Such a wind would naturally take the Vikings out to sea, for in the course of their two days' sailing, the winds would normally change to northerly and north-westerly so that the course would curve towards Cabot Strait, and bring Leif to a position where he would be bound to seek his landfall somewhere in the region of Nova Scotia.

In the second part of the book the author is not so successful in showing that Thorfinn Karlsefni must have settled in Hudson Bay. As he says Thorfinn must have made his first settlement well to the North of Vinland; but the sailing of Leif from Bear Island for two days before a north wind would not bring him to Ungava Bay, whether Bear Island were off the Greenland or the Baffin Land coast. It is not disputed that Thorfinn was seeking Leifsbudir and it is difficult to imagine that his wife, widow of Leif's brother, should not have known just how to reach the family lands at Leifsbudir. The error on Leif's part was in leaving Furderstrandir (from its description very probably part of Western Newfoundland where Leif found the sandy beaches) in the wrong wind. Probably their landings at Straumey were somewhere either on the New Brunswick coast or in Prince Edward Island, and at Hóp somewhere too far south of Leifsbudir.

The Skraellings whom Karlsefni captured were real. As far back as 1912, Thalbitzer showed that the words the Norsemen took to be names were really phrases in good Eskimo. Thus there were Eskimo in Markland (Newfoundland)and Indians having traits of early Algonquian type in Vinland in those days.

However these are minor matters and, although the most sensational theory of the book is not very sound, the work is an important one worth careful study. In particular it gives the sagas in full just at the stage when their study is becoming of importance in connection with stray archaeological finds. C. A. B.

L'AMÉRIQUE. By JEAN GOTTMANN. *Paris: Librairie Hachette*, 1949. $9 \times 5\frac{1}{2}$ *inches;* 451 *pages; maps, diagrams, and illustrations.* 980 *fr.*

The completion of the twenty-three volumes of the 'Géographie universelle' in 1948 has barely preceded the commencement of a new series of texts entitled 'Les cinq parties du monde' which promises to be, as it were, a supplement

to the longer work. L Amérique' is the first of this new series which aims at providing on a moderate scale an up-to-date account of the geography of the main land-masses of the world. Throughout the volume, statements and statistics are as a rule brought up to 1947 or 1948 and particular attention is paid to post-war developments.

The first part, of eighty pages, deals mainly with the general physical background and settlement of the New World. The second part, 161 pages, discusses in greater detail Anglo-Saxon North America. Its six chapters include one on "The Arctic out-posts" and one on "The civilisation of the U.S." in which the author, from his own observation, outlines the human stresses and strains of that civilization. The third part deals with Central America and the fourth contains a description of the countries of South America. The frequent mention of topical problems and the discussion, for example, of recent political and economic developments in the Argentine leave the reader in no doubt as to the importance of the last ten years.

This volume will be of considerable interest to a wide public, while specialists will find in it a judicious summary of the geography of the New World. Throughout, the text is enlivened by effective diagrams and by stimulating and provocative statements such as are to be expected of an author who has lived long in the territories he describes. In brief, this book is much more than a convenient résumé of geographical matter on the New World; it has an outlook and unity of its own and is, in addition, as the useful bibliography indicates, a worthy supplement to larger and more localized works on the Americas.

R. P. B.

SOUTH AMERICA CALLED THEM. By VICTOR W. VON HAGEN. *London: Robert Hale*, 1949. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xiv+401 *pages; maps and illustrations.* 21*s*

This is a popular account of the explorations of four great naturalists, written in a rather florid but vivid and readable style. The author's thesis is that South America was opened up to big business by the information gathered and the books published by the scientific explorers. Darwin's journal, much of which was originally written to amuse his family, sold out within a year and did much to stimulate other explorers. Spruce was a botanist, who carefully recorded the uses to which the Indians put the plants; and by getting them named, and analysed by chemists, his work "provided the agents of business with a guide-book to the riches of the Amazon." La Condamine was sent to South America by the Academie des Sciences to measure the arc of the meridian and became, among other things, the modern discoverer of *Hevea* rubber. Rubber, from the genus *Castilloa*, had already been seen by Cortez, who found the Astecs playing *tlachtli* with solid rubber balls. Humboldt was originally to have gone to Egypt on a scientific expedition, which was planned on a grand scale by Napoleon with one hundred and sixty scientists, but the destruction of the French fleet at Aboukir put an end to the project and his expedition to South America with Bonpland followed. The author fills in the historical background to these travels, telling for instance of the expeditions for the extermination of the Pampas Indians at the time of Darwin's visit. The illustrations are well chosen, but it is a pity that the author often fails to mention their source.

A. H. G. A.

THE CONDOR AND THE COWS. By CHRISTOPHER ISHERWOOD. *London: Methuen*, 1949. $9 \times 6\frac{1}{4}$ *inches;* xv+195 *pages; map and illustrations.* 21*s*

On the jacket this book is aptly described as the travel-diary of a journey in South America and it does not pretend to be more than that. It has no geographical importance, but it has the advantage that it is accompanied by

some good photographs by William Caskey, the author's companion on his journey.

As a travel book, it is far removed from the unsurpassed and perhaps unsurpassable standards set by Kinglake and R. L. Stevenson; but it gives a definite, though unevenly focussed, impression of not unusual journeys in certain of the South American republics. Any reader who is familiar with much of the ground covered will hardly be able to forget the fact that the journeys were undertaken for the sake of the book, which is perhaps likely to appeal most to readers who have never been in South America. As a diary, this is an ample record of things seen in the regions visited, generously supplemented by reports of conversations in which the information imparted to the travellers was not always unbiassed or reliable. Many of the incidents related would find their equivalents in most similar diaries, but some of them are amusingly told, and perhaps this justifies their publication. It is a pity that the admixture of political discussion and the large number of unanswered questions posed by the author detract from the general effect. Too often the style verges on journalism and the rather frequent similes, used to add colour to the narrative, actually subtract from its verisimilitude when they are far-fetched. Even a powerful locomotive on a serpentine railway cannot be credited with "cracking its train of four or five coaches like a whip" (p. 33).

Mr. Christopher Isherwood frankly admits that neither he nor his companion, the photographer, is a good tourist, and one wonders whether they really enjoyed their self-imposed task. They saw a lot in six months but, to the author at least, South America apparently remains an enigma. According to the final page, which is unnumbered, something is cooking there, but nobody now alive will ever know what it is.

Misprints are rare. "Battles of Curaçao" (p. 5) must be even rarer. *Puna* (p. 126) should be *puña*. A. V. C-P.

PHYSICAL GEOGRAPHY

CLIMATOLOGY: treated mainly in relation to distribution in time and place (being the third edition of 'Climate'). By W. G. KENDREW. *Oxford: University Press*, 1949. 9×6 *inches;* 383 *pages; maps, diagrams and illustrations.* 30*s*

Some there are who incline to regard climatology as one of the desolate end-products of meteorological observation. That this view is unjustified has of late years been made clear. Climate is capable of change, and the amplitude and rate of change are becoming worthy of study. Meteorologists are renewing their interest in the variations of the areas subject to the dominance of one or other air-mass and geographers are again attracted by the applications of climatic change to their estimates of the accomplishment and prospects of mankind.

But it is always needful to be aware of what is considered normal and where and when such states prevail. Students of climatology must begin somewhere; and if they are to adopt the geographical approach they may indeed be commended to this new edition of a justly well-known text whose style, clarity of writing, straightforward aims and compact information have proved welcome from the sixth form onward to nearly a generation of British students. The study of the earth's atmosphere is that of a mobile medium of immensely complicated behaviour; and it is the reviewer's opinion that the geographical approach through climate to meteorology still offers a good way of making meteorologists, provided that the subject of climate is treated as a live study and not as an assemblage of dull but necessary facts for examinees.

Mr. Kendrew's long-awaited third edition has been considerably enlarged

from that which so many of us already esteem. The felicitous printing, diagrams and illustrations add to the lively scholarship inherent in the writing. The treatment remains straightforward. Forty-one short chapters fall into six sections on insolation and temperature; pressure and winds; atmospheric water vapour and its consequences; mountain and plateau climate; the weather of the westerlies and "some climatic types." Undoubtedly the section on the weather of the westerlies, which takes the reader into the simpler frontal concepts, will be widely appreciated. The author wisely refrains from committing the reader too far in the present state of our knowledge, for example with regard to tropical cyclones.

Readers will question a few minor points; for example (pp. 46–47) slightly lower extremes of cold can now be quoted. On page 48 it is said that at Simla the screen temperature has never been known to fall below 40°; but from 'Climates of the continents' one may cite a December mean of 43°.4, January 38°.8. With reference to the Polar regions some readers would find it helpful to know why there appears to be a considerable daily range in midwinter (pp. 96–100). "Four or five feet of snow from a single storm is not uncommon on the lower hills of Britain" (p. 231) is in the reviewer's opinion an overstatement in the light of actual measurements. On page 259, for "the Orkneys" it seems that "the Shetlands" should be read. The statement that the north slopes of the Pyrenees are always covered with snow for the upper 2000 to 3000 feet (p. 289) is a little exaggerated if the reviewer's recollections of the Port de Venasque and the Carlitte are acceptable.

The section on mountain and valley winds is splendid; indeed, the author's truly English delight in the High Alps is apparent and will give pleasure to many. Useful diagrams and illustrations abound, chosen from very many sources. All British readers deserve the reminder, in the grim photograph facing page 256, of our national guilt in respect of atmospheric pollution. The author's comment on the Brückner cycle (p. 359) might, in the light of later work, have been qualified; Wagner for example has declared that Brückner's views in this field are "erroneous, and merely of historic interest." There is a useful short bibliography, but the index appears to be a little incomplete, *e.g.* Greenland (discussed on p. 168) is omitted.

But such criticisms as these are very minor, when one considers the comprehensive sweep with which the elements of a big subject have been compactly covered. The treatment places no strain on anyone's mathematics, but will coax forth their rusty physics in painless and exemplary fashion. Travellers, administrators and explorers, as well as students, will find it a thoroughly readable and attractive introduction, and the wide range of quotations from descriptive literature makes a pleasing adornment. G. M.

CARTOGRAPHY

MAPS AND MAP-MAKERS. By R. V. Tooley. *London: Batsford*, 1949. 10×7½ *inches;* viii+128 *pages; illustrations.* 30*s*

The history of cartography touches many subjects: mathematics, history, palæography, engraving—to mention the more obvious only—and it is probably beyond the power of a single writer to deal satisfactorily with the whole. Mr. Tooley aims at providing information on the "principal map-makers and their work from the earliest times to the nineteenth century," with special regard to what he calls the "popular decorative side," and bibliographical notes. The map-makers with whom he mostly deals are engravers and publishers, rather

than surveyors, and many of those he lists simply copied their predecessors or contemporaries assiduously. The reader will gain little idea of how far, and why, Saxton's county maps differ in accuracy from the Ordnance Survey 1-inch map. The book is avowedly a guide for collectors and, within limits, it serves this purpose effectively. Each chapter is followed by useful lists of the output of the various cartographers, engravers, and publishers, and by bibliographies.

There are however a number of statements in the text which are debatable or erroneous. The very condensed account of Ptolemy's work is somewhat misleading; the Catalan Atlas of 1375 shows little trace of his influence; Hondius' great world map of 1608 is not mentioned; Mercator's map, if the reference is to the one on his projection, was not used in the early editions of his 'Atlas.' Frequently the significance of the work quoted is missed: that Robert Dudley's maps in his 'Arcano del Mare' were on Mercator's projection, for example, or that the maps in the 'Nouvelle Atlas de la Chine' were prepared by D'Anville from actual surveys of the Jesuits. Points such as these might be considered in a second edition, in which misprints, particularly in references to foreign works, must also be corrected. The book has ninety-five plates, some in colour; these convey very well the general changes in the style of map reproduction.

G. R. C.

HANDBOOK OF AERIAL MAPPING AND PHOTOGRAMMETRY. By L. G. TROREY. *Cambridge: University Press*, 1950. 10×6½ *inches;* xvi+178 *pages; diagrams and illustrations.* 25*s*

STUDIES IN PHOTOGEOLOGY. By ROBERT HELBLING. *Zurich: Art. Institut Orell Füssli A.-G.*, 1949. 12×8½ *inches;* 137 *pages; diagrams and illustrations; maps in pocket*

The first 57 pages (approximately half the contents) of Dr. Trorey's book are taken up with a condensed account of the early graphical methods of dealing with random obliques. Next are described the elementary principles of stereoscopy, the use of the parallax bar and also the old Z.D. 15 stereoscope (now virtually discarded). There is a chapter on radial line plotting, another on rectification, and at the very end a brief description of the principles governing automatic plotting instruments, in particular the Multiplex. There are two appendices, the first summarizes the procedure followed in the last war by the Royal Canadian Engineers for reconnaissance mapping by simple graphical methods, while the second gives some rather optimistic factors relating flying height to contour interval for Multiplex mapping, which should be treated with considerable reserve.

The book contains no information on cameras or aircraft, nor on the varied applications of aerial mapping. Interpretation (one of the most important subjects of all) is dismissed in a single short paragraph. There is no attempt in this book to bring the reader up to date with modern photogrammetric practice and it is not clear what purpose the author and publishers had in mind in producing at this time an expensive edition which adds little if anything to existing literature on the subject.

Dr. Helbling's book is concerned not so much with geological interpretation of air photographs as with the application of photogrammetry to geological mapping. In view of this the title is rather misleading. In the author's words "industry, engineering and research still lag behind in the use of photogrammetry, whereas specialists in photogrammetry have improved methods and have opened up a scarcely recognized field to those who will really profit from its use."

Dr. Helbling was one of the first to originate the now well-established technique

of photo-geological survey, and has done much to bring home to the conventional geologist the enormous value of air photographs and the use of three-dimensional plotting instruments in providing the topographic contoured maps which form the basis of all detailed geology.

Particularly interesting is the method illustrated on page 52 which introduces a parallel shift of the contours in the plotting of steep escarpments and overhanging rock faces, thus enabling precise vertical sections to be taken off from the contoured plan, even in areas of totally inaccessible terrain. The method is one that should prove of special application in other fields besides geology, especially in engineering surveys of dam sites, bridge and viaduct abutments and in the routing of overhead cable ways.

The author also stresses the adaptability of the Heerbrugg A.5. Autograph in being able to provide vertical projections from the same pairs of photographs as are used for ground plans. Like the contours on a map, the projection sketch lines are plotted continuously with the autograph which produces a scaled orthogonal projection. There are some excellent illustrations at the end of the book demonstrating the geological value of these projection sketches.

The author is at some pains to stress the superiority of the Heerbrugg Plotter A.6. for small and medium scale mapping over other types of instruments (in particular the Multiplex). He does not however mention any of the limitations of the A.6. and also admits that in Switzerland they have had no experience of the Multiplex. (Of all subjects photogrammetry seems to suffer most from parochialism!) Without four control points per overlap, the A.6. stereo plotter is of little use and it is difficult to understand how such an instrument can be successfully employed for the small scale mapping of undeveloped countries, for which type of work the Multiplex has undoubted advantages. At the same time it must be agreed by those who have used both Multiplex and A.6. that the latter instrument is superior in accuracy and ease of operation. Probably the most efficient solution to small scale mapping of hilly country with limited control would be a combination of Multiplex and A.6., the former being used for the aero-triangulation of the strips and the latter for detailed plotting. (The A.6. has an advantage in that it can plot direct at the reduced scale of the final map.)

Taken as a whole Dr. Helbling's work must be considered as a valuable and original contribution to the still limited field of photogrammetric literature. It suffers perhaps from too much verbosity, which may be illustrated by the author's use of the term "autogrammetric photogrammetry". Photogrammetry is admittedly a word now too well established to be discarded, but in this case the word "spatial" could well be substituted for "autogrammetric" with equally good sense. Some of the prolixity of the text could have been avoided by a greater freedom in the translation; nevertheless this is not to discount the achievement of Professor Odell in carrying out a difficult task successfully.

P. G. M.

GENERAL

ESSENTIALS OF GEOGRAPHY. By O. W. Freeman and H. F. Raup. *New York: McGraw Hill*, 1949. 10×7½ *inches;* vii+487 *pages; maps, diagrams and illustrations.* 42*s* 6*d*

A GEOGRAPHY OF MAN. By Preston E. James. *Boston: Ginn*, 1949. 9½×6½ *inches;* xv+631 *pages; maps, diagrams and illustrations.* 36*s*

'Essentials of geography' is a general textbook primarily designed for university students. Descriptions of the climates of the earth and their relation to man are

followed by accounts of mountains, plains and oceans as well as of minerals and forests. The rest of the book is devoted to a survey of the world's economic resources and to a study of the distribution of population and rural and urban communities. Each of the twenty-six chapters is followed by a list of carefully selected references and by a number of problems suggested for further study. The book is lavishly illustrated with maps and pictures and has the merit of being up-to-date in its treatment of current events. Nevertheless it is merely another addition to the already large number of general textbooks and is not marked by any special originality of presentation.

'A geography of man' by Professor Preston James is also intended for use as a textbook, but its unusual treatment of the subject should make it interesting to the general reader, as well as to the student of social sciences other than geography. The book is planned to describe the distribution and density of population in relation to the relevant physical and cultural elements of the total environment. In his preface the author postulates the five concepts regarding man's relation to the land which he elaborates. The world is divided into eight major groups of natural regions and in each group the same method of treatment is used. After a systematic account of the land, its vegetation, climate and surface features he goes on to describe its "occupance," which he defines as "the process of occupying or living in an area and the transformations of the original landscape which result." He thus emphasizes the differences in economic development and pattern of settlement between the eight groups. A final chapter on the Industrial Society is used to illustrate the author's belief that "its base area cannot be less than the whole globe; and that its survival therefore depends on the achievement of some measure of world unity." Specialized material on maps, atmosphere, lithosphere and hydrosphere are relegated to appendices with full bibliographies and a set of 27 reference maps. The book is generously illustrated with some 239 figures. Readers of Professor Preston James' 'Latin America' will remember the attractive style of his writing and the clarity of his thought; both are repeated in his new volume. 'A geography of man' is to be commended as a very readable book and it is to be hoped that it will introduce others besides university students to a serious study of geography.

E. W. G.

WEBSTER'S GEOGRAPHICAL DICTIONARY. *Springfield, Mass.: G. and C. Merriam and Co.*, 1949. 10×7 *inches;* xxxi+1293+xxiv *pages; maps.* $8.50 or 68*s*

This is the first comprehensive world-gazetteer to appear in English, except for the reissue of several well-known standard works, since 1906. As it records a large number of the official changes in the administrative subdivision of such countries as Russia, and in national orthography, as in Brazil and Turkey, and seems moreover to be reliable in main particulars, it will be a most useful addition to works of reference. It lists about 40,000 names, mainly under the forms now familiar to educated Americans, but the reader is often left to decide for himself which of several alternatives to select for use (see such entries as Saragossa and Zaragoza). Localization is by reference to parts of countries, and to prominent neighbouring places or geographical features. The maps are dull, but the typography is excellent and the rendering of diacritical marks almost faultless. It is perhaps inevitable that in an American work Moscow (Idaho) should appear before Moscow (Russia), and Portsmouth (Dominica) before Portsmouth (England); and that such unofficial forms of names as "British" Malaya and "British" Solomon Islands should be given. Australians may not agree that Port Adelaide is "Australia's main port of call

for European vessels" or that Port Jackson has "miles of wharves on either side." British historians will be amused at the complete misunderstanding of our use of the name *Mare Nostrum* during the late war. There is inconsistency in the presentation of Albanian names, which are given indiscriminately in definite or indefinite form, and in transliteration, particularly of modern Greek names. Spitsbergen and Svalbard are presented as alternative, which they are not. And there are too many Latin names. The Arabic name for the Red Sea would now be more useful than the Latin, and is just as "classical." The omissions are interesting. Port Augusta (South Australia) is given, but the more important Whyalla of the same region is omitted. Middle and Far East are explained (the former unsatisfactorily), but Middle and Far West are omitted though the Midlands appear. Considering the magnitude of the work, criticism loses itself in quibbling, and one can only regret that even these 1293 pages are merely provisional. Rapid change in geographical nomenclature is one of the features of the political movement of our time. M. A.

MOUNTAINS IN COLOUR. By F. S. SMYTHE. *London: Max Parrish*, 1949. 11½×8½ *inches; 155 pages; illustrations.* 25*s*

In the recent past many of the late Frank Smythe's readers and friends complained of and to him that he was churning out too many books. It was felt that quality was not being maintained, that the butter was being spread rather thinner on less fresh bread. One can rejoice that in this latest, and also last, book the old standards have been regained and indeed surpassed.

The publishers, too, are to be congratulated wholeheartedly. Though not exceeding the price of many previous volumes they have achieved unusually high qualities of reproduction. All the photographs are in colour and the Dutch firm responsible for the photogravure deserves great praise. Only once or twice (*e.g.* the plates opposite pages 25 and 100) have the plates slipped a fraction so that superposition is not perfect. One would be proud to see such finished work from a British firm; no doubt current restrictions had much to do with the choice of Holland.

Of the photographs themselves, all are good and many rise far beyond any ordinary level. They are divided into groups to cover the mountain ranges Smythe loved and knew so well, the Himalayas, the Alps, our own islands and North America. He has not relied on good lighting as would perforce so many less experienced photographers. Many of his pictures achieve good colour rendering despite wide variations of lighting and some (*e.g.* plate 4) were taken in almost freakish light conditions in which it is a triumph to preserve fidelity.

High mountains above the snowline are not ideal for colour work precisely because they lack colour. For this reason the pictures of the Himalayas, impressive though they are, do not quite rank with those of lesser ranges. One remembers rather the patience and stern will-power required to take photographs in such conditions. The extreme clarity of the atmosphere above 10,000 feet has much to do with this. It tends to give an impression of flatness that can at times be unreal. What is needed is an atmosphere with some "body" to it, such as is found (often to excess!) in the British Isles. Here Kodachrome really comes into its own and Smythe has grasped the opportunity cunningly. The Pacific Coast and the Rockies also provide superb views in this volume, while perhaps best of all are the evocative pictures of the little hills of New England in their blazing autumn guise. This is colour indeed, rendered by a master hand and as faithfully processed and reproduced. Where all are good, selection of the best is difficult but the palm should perhaps go to plate 55 though it is not a mountain view. The text accompanying the pictures, which have in addition clear and

agreeable captions, is designedly "popular" but it should cause no offence in expert circles and to a wider public is a very pleasant and helpful introduction of the regions selected.

This is not a book to stow away on a shelf. It should lie on an occasional table accessible to all. Few who pick it up will put it down until they have at least glanced at every picture and those who knew Frank Smythe will recall his gallant spirit and wholehearted devotion to the hills. D. L. B.

ADDITIONS TO THE LIBRARY AND MAP ROOM

EUROPE

EUROPE

By A. R. B. Simpson. $7\frac{1}{2} \times 4\frac{1}{2}$. xii + 257 pp. Illustrations, sketch-maps and diagrams. *London: G. Bell & Sons*, 1950. *5s 6d*

THE COUNTY BOOKS

BEDFORDSHIRE. By L. Meynell. 448 pp. NORTHUMBERLAND. By H. L. Honeyman. 288 pp. SOMERSET. By M. L. Turner. 270 pp. ISLE OF MAN. By E. H. Stenning. $8\frac{1}{2} \times 5\frac{1}{2}$. Maps and illustrations. *London: Robert Hale*, 1950. *15s a volume*

THE LITTLE GUIDES

BUCKINGHAMSHIRE: revised by R. L. P. Jowitt and E. C. Rouse. 212 pp. CORNWALL: rev. by H. R. Hicks. 184 pp. DERBYSHIRE: rev. by E. C. Williams. 180 pp. KENT: rev. by R. F. Jessup. 308 pp. *London: Methuen*, 1950. 6×4. Illustrations and maps. *7s 6d a volume*

These well-known guides have been thoroughly revised. They are convenient in size, well illustrated, and informative, particularly on local architecture and history.

THE DENUDATION CHRONOLOGY OF THE DIP-SLOPE OF THE SOUTH DOWNS

By B. W. Sparks. (*Proc. Geol. Assocn.* 60 (1949) 165–215; diagrams)

THE MERSEY ESTUARY

By J. E. Allison. $8\frac{1}{2} \times 5\frac{1}{2}$. 60 pp. Maps and illustrations. *Liverpool: Univ. Press*, 1949. *3s 6d*

A valuable account of the geographical advantages and disadvantages of the estuary as the site for a great port, the methods taken to tame the river, and the development of dock facilities.

EARLY INDUSTRIAL SETTLEMENT IN NORTH-WEST ENGLAND

By A. E. Smailes. (*Adv. of Sc.* 6 (1950) 325–31)

THE BURIED BARONY

By A. A. MacGregor. $8\frac{1}{2} \times 5\frac{1}{4}$. xvi + 164. Illustrations. *London: R. Hale*, 1949. *12s 6d*

Eight essays on out-of-the-way areas of Scotland; the first deals with the sand dune area of Culbin on the Moray Firth.

DAS EINFLUSSGEBIET DER STADT TURKU

By Oiva Tuominen. (*Fennia*, 71 (1949), No. 5. 138 pp., sketch-maps)

Includes a theoretical discussion on the determination of urban spheres of influence.

GEOGRAPHICAL REGIONS OF FRANCE

By E. de Martonne. 2nd edition. $8 \times 4\frac{1}{2}$. xi + 224 pp. Sketch-maps and diagrams. *London: W. Heinemann*, 1948. *7s 6d*

RURAL SETTLEMENT IN THE GERMAN LANDS

By R. E. Dickinson. (*Ann. Assocn. Amer. Geogr.* 39 (1949) 239–63; maps)

SCHOTTERFLUREN UND TALAUEN IM NIEDERSÄCHSISCHEN BERGLAND

By Horst Mensching. (*Göttinger Geogr. Abhandl.* 4 (1950) 54 pp.; maps and illustrations)

MORPHOLOGISCHE UNTERSUCHUNGEN IM MITTELHARZ

By Jürgen Hovermann. (*Göttinger Geogr. Abhandl.* 2 (1949) 80 pp; maps and illustrations)

DIE FRANKFURTER ALTSTADT: eine historisch-geographische Studie

By Karl Nahrgang. (*Rhein-Mainische Forschgn.* 27 (1949) 88 pp.; maps, etc.)

A detailed study, with many sketch-maps and sections, of the site and growth of medieval Frankfurt-am-Main, based in part on recent excavations.

ICELAND YESTERDAY AND TO-DAY

By Horace Leaf. $8\frac{1}{2} \times 5\frac{1}{2}$. 206 pp. Illustrations. *London: Allen and Unwin*, 1949. *15s*

The author carried out a lecture tour through Iceland in 1946, and in his book blends what he saw for himself with historical information.

LA VALSAVARANCHE: studio antropogeografico

By Giuseppe Barbieri. (*Riv. Geogr. Ital.* 54 (1949) 301–30; map and illustrations)

A high valley in the Dora Baltea, which is steadily losing its population.

LE PORTUGAL

By P. Birot. $6\frac{1}{2} \times 4\frac{1}{2}$. 222 pp. Sketch-maps. *Paris: Librairie Armand Colin*, 1950. *180 fr.*

MADÈRE: un milieu géographique jeune
By M. A. Lefèvre. (*Bull. Soc. Belge d'Études Géogr.* 18 (1949) 57–78; illustrations)

CARTAGENA: notas de geografia urbana
By Joaquin Bosque Maurel. (*Estudios Geogr.* 10 (1949) 578–638; illustrations)

INTRODUCTION TO SWEDEN
By I. Andersson and others. $8\frac{1}{2} \times 5\frac{1}{2}$. 311 pp. Map and illustrations. *Stockholm: Swedish Institute*, 1949. 21*s*

UNE NOUVELLE CARTE LINGUISTIQUE DE LA SUISSE
By A. Dami. (*Geogr. Helvetica*, 4 (1949) 199–205; map)
The map in colour on the scale of 1 : 50,000 was compiled by Henri Frey.

A HISTORY OF MOUNTAINEERING IN THE ALPS
By Claire Eliane Engel. $9\frac{1}{2} \times 6$. 296 pp. Illustrations. *London: Allen and Unwin*, 1950. 21*s*
A very readable and informative book, ranging from de Saussure to war-time exploits, and dealing with many aspects of mountaineering-history, technique, equipment, and Alpine literature. The illustrations are varied and effective.

ASIA

NOTES SUR L'ÉVOLUTION RÉCENTE DE L'HABITAT URBAIN EN ASIE
By Jean Chesneaux. (*Information Géogr.* 14 (1950) 1–8)

LA VIEILLE ROUTE DE L'INDE DE BACTRES À TAXILA
By A. Foucher and E. Bazin-Foucher. 2 vols. 15 × 11. viii + 426 pp. Illustrations, sketch-maps and diagrams. *Paris: Les Editions d'Art et d'Histoire*, 1947. £8 8*s*

SOME EARLY TRAVELS IN ARABIA
By C. F. Beckingham. (*J. R. Asiatic Soc.* 1949, 155–76)

FRIENDLY CHINA; two thousand miles afoot among the Chinese
By Bailey Willis. $9\frac{1}{2} \times 6$. xviii + 312 pp. Illustrations and maps. *California: Stanford Univ. Press*, 1949. 40*s*
This journey was made in 1903–04, and is narrated in letters written at the time. Prof. Bailey Willis believes in "the steadfast self-respect and unalterable philosophy of life" of the Chinese people, which remain despite political upheavals.

SOME NOTES ON THE KARUN RIVER AND THE SHATT EL ARAB
By G. M. Binnie. (*J. Inst. Civil Engin.* 1949–50, 204–52; map and diagrams)

THE ANTHROPOLOGY OF IRAQ. Pt. 1, No. 2. The lower Euphrates–Tigris region
By Henry Field. (*Anthrop. Ser., Field Museum*, vol. 30, pt. 1, no. 2, (1949), 232–426; illustrations)

PAKISTAN, THE FATHERLAND OF THE PAK NATION
By C. R. Ali. 3rd edition. $8\frac{1}{2} \times 5\frac{1}{2}$. 392 pp. Maps and illustration. *Cambridge: Pakistan National Liberation Movement*, 1947. £1

LE PROBLÈME STRUCTURAL DE LA BEQAA' à propos de la "Reinterprétation du fossé Syrien" par E. de Vaumas
By J. Angénieux. (*Mélanges de l'Univ. St. Joseph, Beyrouth*, 27 (1947–48) 159–66)

TURKEY: an expanding agricultural economy
By C. S. Stephanides. (*Foreign Agriculture*, 13 (1949) 196–201)

AFRICA

LA CONOSCENZA GEOGRAFICA DELLA DANCALIA MERIDIONALE
By "Africanus." (*L'Universo*, 29 (1949) 395–405; maps and illustrations)
Deals largely with the mapping of the area.

DIE GROSSE RANDSTUFE AUF DER OSTSEITE SÜDAFRIKAS UND IHR VORLAND
By Erich Obst and Kurt Kayser. (*Sonderveröffentl.* 3, *Geogr. Ges. Hannover*, 1949; 342 pp. illustrations and maps)
This important work contains the results of morphological research carried out in 1935–36. The particular object was to study the eastern escarpment and the coastal area of the Transvaal, in relation to the evolution of South Africa. The volume is well provided with geomorphological maps, profiles and instructive photographs.

THE FIRST SOUTH AFRICANS and the laws which governed them; to which is appended the Diary of Adam Tas
By M. Whiting Spilhaus. $8\frac{1}{2} \times 5$. 284 pp. Illustrations. *Cape Town: Juta*, 1949. 42*s*
Deals with the daily life and social customs of the freemen, and their relations with the East India Co. officials in the 17th century. Conflict arose over barter with the Hottentots, and the predominance of the company's interests.

SOME GEOGRAPHICAL PROBLEMS OF LAND USE IN BRITISH WEST AFRICA
By R. W. Steel. (*Trans. Inst. Brit. Geogr.* 14 (1948) 29–42)

LA ROUTE DU KOLA
By M. H. Lelong. (*Rev. geogr. humaine*, No. 4, 1949, 35–44; illustrations)
Discusses the traffic in kola nuts between Liberia and French Guinea.

LES FANG DU PAYS YAOUNDÉ
By Gérard Perrault. (*Cahiers d'Outre-Mer*, 2 (1949) 313–33; illustrations)

NORTH AMERICA

THE DISCOVERY OF AMERICA: an inaugural lecture
By A. Davies. Exeter, 1949. $8\frac{1}{4} \times 5\frac{1}{2}$. 24 pp. Sketch-maps
The author accepts a Portuguese discovery in the Caribbean in or before 1486, and believes that the Portuguese encouraged the Spaniards to continue to explore in this quarter, to keep them away from the more practicable route to the Indies.

NATURAL DIVISIONS OF THE CANADIAN SHIELD
By J. E. Gill. (*Trans. R. Soc. Canada*, 43 (1949), Sect. 4, 61–69)

HISTOIRE DE LA GRANDE PÊCHE DE TERRE-NEUVE
By Robert de Loture. $7\frac{1}{2} \times 4\frac{1}{2}$. 256 pp. Sketch-maps. *Paris: Gallimard*, 1949
A history of the French fisheries, with an account of technical developments and the present position of the commerce.

ON THE FOREST GEOGRAPHY OF THE LABRADOR PENINSULA: a preliminary synthesis
By Ilmari Hustich. (*Acta geogr., Helsinki*, 10 (1949), No. 2, pp. 63; sketch-maps)

THE RECESSION OF THE WISCONSIN GLACIER IN SOUTHERN ONTARIO
By L. J. Chapman and D. E. Putnam. (*Trans. R. Soc. Canada*, 43 (1949), Sect. 4, 23–52)

MAP MAKER AND INDIAN TRADERS
By H. N. Eavenson. 10×6. xvii+275 pp. Maps. *Pittsburgh: University of Pittsburg Press*, 1949

SOUTH AND CENTRAL AMERICA

ISLANDS IN THE SUN
By Rosita Forbes. $9 \times 5\frac{1}{2}$. 167 pp. Map and illustrations. *London: Evans Bros.*, 1949. 12*s* 6*d*

LA MARTINIQUE
By E. Revert. $9 \times 5\frac{1}{2}$. 559 pp. Maps and illustrations. *Paris: Nouvelles Éditions Latines*, 1949. £2 8*s*

ASPECTOS GEOGRAFICOS DEL POBLAMIENTO DE PUERTO RICO
By A. F. Chaves. (*Rev. Geogr., Inst. Pan-Americano de G.* 5–8 (1949) 57–68; map)

LA CUENCA DE ANDALGALA EN LA ARGENTINA
By Helmuth Kanter. (*Inst. de Estudios Geogr., Tucuman: Monogr.* No. 11 (1948) 36 pp.; illustrations)

ANDEAN UPLIFT AND EROSION SURFACES NEAR UNCIA, BOLIVIA
By Eugene H. Walker. (*Amer. J. Sc.* 247 (1949) 646–63; illustrations)

REGIÕES DE CIRCUNDESNUDAÇÃO PÓS-CRETACEA, NO PLANALTO BRASILEIRO
By Aziz Nacib Ab'Saber. (*Bol. Paulista de Geogr.* 1 (1949) 3–21; maps)

LE PAYS DE BELEM (BRÉSIL)
By Pierre Gourou. (*Bull. Soc. Belge d'Études Géogr.* 18 (1949) 19–36; illustrations)

ANTIOQUEÑO COLONIZATION IN WESTERN COLUMBIA
By James J. Parsons. (*Ibero-Americana: Berkeley, Cal.* 32 (1949) 212 pp.; illustrations)

RECONNAISSANCE IN DYNAMIC REGIONAL GEOGRAPHY: Tierra del Fuego
By Robert S. Platt. (*Rev. Geogr. Inst. Pan-Americano de G.* 5–8 (1949) 3–22; illustrations)

AUSTRALASIA AND PACIFIC

OIL—THE ELUSIVE: the search in the Australian region
By Arthur Wade. (*Australian Geogr. Mag.* 15 (Oct. 1949) 10–19; map and illustrations)

TRAVELLER'S TRACKS
By George Farwell. $8\frac{1}{2} \times 5\frac{1}{2}$. 168 pp. Illustrations and sketch-maps. *Melbourne: Univ. Press*, 1949. 12*s* 6*d*
The author, in these brief essays, is concerned with bringing out the contrasts presented by the Australian interior, from abandoned country towns to present-day Broken Hill.

ONE MOUNTAIN AFTER ANOTHER

By A. Groom. $8\frac{1}{2} \times 5\frac{1}{2}$. 206 pp. Illustrations. *Sydney and London: Angus and Robertson*, 1949. 15*s*

An account of the exploration and early history of the McPherson ranges in southern Queensland and of the establishment of the Lamington National Park, with notes on the natural history, and good photographs of mountain scenery.

THE SHORE PLATFORMS OF LORNE, VICTORIA

By J. T. Jutson. (*Proc. R. Soc. Victoria*, 61 (1949) 43–59; plates)

STRANGE MOUNT OLGA

By John Béchervaise. (*Australian Geogr. Mag.* 15 (Dec. 1949) 10–14; illustrations)

THE OTAIHANGA FAULTED OUTLIER AND NOTES ON THE GREENSAND DEPOSIT

By E. O. Macpherson. (*N.Z. J. of Sc.* 30 (1948) B. 70–83

The glauconite sandstone may be commercially exploitable.

TAINU: the story of Hoturoa and his descendants

By L. G. Kelly. $9\frac{1}{2} \times 5\frac{1}{2}$. xii+483 pp. Maps and illustrations. *Wellington: Polynesian Society*, 1949

STUDIES IN THE ANTHROPOLOGY OF BOUGAINVILLE, SOLOMON ISLANDS

By D. L. Oliver. (*Papers Peabody Mus., Harvard*, 29 (1949) Nos. 1–4; illustrations)

POLAR REGIONS

TOPOGRAPHY AND SEDIMENTS OF THE ARCTIC BASIN

By K. O. Emery. (*J. of Geol.* 57 (1949) 512–21; map)

Summarizes present knowledge of the floor of the Arctic Ocean.

LE CANADA ARCTIQUE

By de R. P. Biname. (*Bull. Soc. R. de G. d'Anvers*. 63 (1949) 5–36)

ICE, OPEN WATER, AND WINTER CLIMATE IN THE EASTERN ARCTIC OF NORTH AMERICA

By F. K. Hare and Margaret R. Montgomery. (*Arctic*, 2 (1949) 79–89; 149–64; diagrams)

STEPPING STONES TO THE SOUTH POLE

By J. R. Nichol. 9×6. xxii+200 pp. Illustrations. *Sydney: Angus and Robertson*, 1948. 15*s*

GENERAL

THE DISSECTION AND ANALYSIS OF MAPS

By A. Austin Miller. (*Trans. Inst. Brit. Geogr.* 14 (1948) 1–13)

SEISMICITY OF THE EARTH and associated phenomena

By B. Gutenberg and C. F. Richter. $11 \times 7\frac{1}{2}$. viii+274 pp. Maps. *Princeton: Univ. Press* (*Oxford U.P.*), 1949. £4

A discussion of the relative seismicity of various regions, and of the geographical and geological characteristics of the centres of activity. The two predominantly active zones are the circum-Pacific and the Mediterranean-trans-Asiatic.

VOLCANOES NEW AND OLD

By Satis N. Coleman. $8\frac{1}{2} \times 5\frac{1}{4}$. viii+212 pp. Illustrations. *London: Museum Press*, 1949. 16*s*

This book treats volcanoes in a non-technical manner, beginning with the emergence of Paricutin and including short accounts of the better-known volcanoes. The photographs, mainly from the American continents, are effective.

ERDE UND WELTALL

By Georg Frebold. (*Kleine Landerkunden*). 8×5. 122 pp. Diagrams. *Stuttgart: Frankische Verhandlung*, 1949. *D.M.5*

Pt. I deals with the earth as a heavenly body: part II surveys the principal problems of astronomy, in so far as they are of interest to geographers.

LA GÉOGRAPHIE DE L'ÉNERGIE ATOMIQUE

By André Savornin. (*Rev. géogr. humaine*, No. 4, 1949, 3–24; illustrations)

THE SEA AND ITS MYSTERIES

By J. S. Colman. $7\frac{1}{2} \times 4\frac{1}{2}$. 285 pp. Map, illustrations and diagrams. *London: G. Bell & Sons*, 1950. 12*s* 6*d*

A REGIONAL ECONOMIC GEOGRAPHY

By S. N. Dicken. $10\frac{1}{2} \times 7\frac{1}{2}$. 516 pp. Map, illustrations and diagrams. *Boston Mass.: D. C. Heath & Co.*, 1950. 25*s*

L'ÉCONOMIE DU COMMONWEALTH

By François Crouzet. (*Que suis-je?*) $7 \times 4\frac{1}{2}$. 136 pp. *Paris: Presses Universitaires*, 1950

HISTOIRE DES CHEMINS DE FER EN FRANCE ET DANS LE MONDE

By Henry Peyret. $7\frac{1}{2} \times 4\frac{1}{2}$. 350 pp. Sketch-maps. *Paris: Soc. des Éditions françaises*, 1949

Mainly concerned with the organization and finances of the railway systems. The writer favours decentralization and a flexible administration.

DESIGN IN RURAL LANDSCAPE

By Brian Hackett. (*Planning outlook*, 1 (1949) 22–38; illustrations)

BERGE DER WELT (Schweizerische Stiftung für Alpine Forschungen)

3. Bd. Fremde Berge-Ferne Ziele. 526 pp. 4. Bd. Karakoram und Tibesti. 240 pp. $9\frac{1}{2}\times6\frac{1}{2}$. Illustrations. *Bern: Verbandsdruckerei*, 1948–49

These two well-produced volumes are part of a series initiated by the Swiss Foundation for Alpine Research. Vol. 3 deals with Swiss achievements outside Europe; it includes accounts of expeditions and biographical notices. Vol. 4 is mainly confined to Tibesti and the Karakoram, and is of special interest to geographers.

JAMES HUTTON, founder of modern geology, 1726–97

By Sir E. B. Bailey. (*Proc. R. Soc. Edinburgh*, 63 (1948–49) 357–68; illustrations)

This number contains four other papers on Hutton.

THE VOYAGES OF CAPTAIN COOK; selected and edited by Christopher Lloyd. 8×5. xxiv+384. Map. *London: Cresset Press*, 1949. 9*s* 6*d*

Fairly lengthy extracts from Cook's journal of the first voyage, and from the official accounts of the second and third voyages, with a short introduction and notes.

LA "WEST INDISCHE PASKAERT DE WILLIAM JANSZ BLAEU" DE LA BIBLIOTHÈQUE ROYALE

By M. Destombes and D. Gernez. (Extr. fr. *Communications de l'Académie de Marine, Belgium*, 4 (1947–49) 1–16; facsimile)

This chart of the North Atlantic, probably engraved about 1630, was one of the earliest to be drawn on Mercator's projection.

HERE ARE DIAMONDS

By E. Rosenthal. $8\frac{1}{2}\times5$. 280 pp. Illustrations. *London: Robert Hale*, 1950. 15*s*

PRIVATE ARMY

By V. Peniakoff, "Popski." 8×5. 512 pp. Map and illustrations. *London: Jonathan Cape*, 1950. 16*s*

THE MIDDLE SEA: a tour of the Mediterranean

By L. G. Pine. $8\frac{1}{2}\times5\frac{1}{2}$. xvi+222 pp. Illustrations. *London: Stanford*, 1950. 18*s* 6*d*

Mainly a history of the peoples of the Mediterranean down to the close of the Middle Ages, with brief comments on later centuries, interwoven with personal observations.

GEOGRAPHISCHES TASCHENBUCH: Jahrweiser zur Deutschen Landeskunde 1950

Ed. by E. Meynen. (*Amt für Landeskunde*) $7\times4\frac{1}{2}$. 290 pp. Maps. *Stuttgart: Reise und Verkehrsverlag*, 1950

Contains much information on German geographers and their work, with sections on the climate, regional divisions, electricity resources, etc. of Germany.

ATLASES AND MAPS

WORLD

THE ADVANCED ATLAS OF MODERN GEOGRAPHY. John Bartholomew. $15\frac{1}{2}\times10$. 98 plates of maps, 10 pp. text; 47 pp. index. *London: Meiklejohn & Son Ltd.*, 1950. 25*s*

A successor to the 'Oxford Advanced Atlas' with several new features, including projections for world maps devised by Mr. J. Bartholomew, population maps, and the use of local official names.

ATLAS DE PORTUGAL ULTRAMARINO e das Grandes Viagens Portuguesas de Descobrimento e Expansão. 19×14. 110 plates of maps. *Lisbon: Ministério das Colónias*, 1948. $400

A well-produced atlas covering the historical, physical and human geography of the Portuguese colonies. Some of the early explorers' routes are problematical.

MAPA-MUNDI EM PROJEÇÃO AZIMUTAL, oblique e equidistante, tendo como centro a cidade de São Paulo. 1/75 M. *São Paulo: Universidade de São Paulo*, 1949

ADMIRALTY CHARTS. 12 New Charts, 16 New Editions, 16 Large Corrections, 1 "Decca" Lattice Chart. *London: Hydrographic Dept., Admiralty*, 1950

PORTUGUESE CHARTS. Angola 11; Mozambique 4; Cape Verde Islands 2; Timor 1. *Lisbon: Ministério das Colónias*, 1940–1946

EUROPE

GREAT BRITAIN. Ordnance Survey. Six-inch map, provisional edition, on National Sheet Lines, 4 sheets, 4*s*. *each sheet;* 146 Quarter sheets, 2*s*. *each sheet;* 1 : 25,000, 75 sheets, 2*s*. *each sheet. Chessington*, 1949–1950.

IRELAND. Six-inch Map. Carlow, sheet 16, 5*s*.; Co. Cork Townland Index, 3 sheets, 6*d*. *each;* Lines of Equal Vertical Magnetic Intensity, and Lines of Equal Anomaly of Vertical Magnetic Intensity 1 : 1,000,000, 3*s*. *Dublin: Ordnance Survey*, 1949

NORWAY. Charts Nos. 110, 453. *Oslo: Norges Sjøkartverk*, 1949

SWEDEN. Ekonomisk-Geografisk Karta över Sverige av W. William-Olsson, 1/1 M; Befolkningens Fördelning i Sverige år 1940, bilaga till ekonomisk-geografisk karta 1/1·5 M. *Stockholm: Nordisk Rotogravyr*, 1946

ASIA

CHINA. General Geological Map 1/1 M, 5 sheets. *Nanking: Geological Survey of China*, 1948

NORTH BORNEO 1 : 5,000. Jesselton Area. 5 sheets. *Teddington: Directorate of Colonial Surveys*, 1949, 2*s*. 6*d*. *each sheet*

AFRICA

MONUMENTA CARTOGRAPHICA AFRICAE ET AEGYPTI par Youssouf Kamal. Tome IV Fascicule IV, 29½×23½. Folios 1384–1484. 1939

To be noticed in the *Geographical Journal*.

CARTE GÉOLOGIQUE INTERNATIONALE DE L'AFRIQUE 1/5 M. Sheet 9. *Paris: Commission de la Carte Géologique Internationale de l'Afrique*, 1950

AFRICA AND THE ARABIAN PENINSULA. 1/12 M. *Washington: National Geographic Society*, 1950

ANGOLA. Carta da Colónia de Angola 1:250,000, 7 sheets; 1/2 M, 1 sheet; 1/4 M, 1 sheet. *Lisbon: Ministério das Colónias*, 1943–1949

BELGIAN CONGO. Atlas Général du Congo. Carte des subdivisions administratives du Congo belge et du Ruanda-Urundi. *Bruxelles: Institut Royal Colonial Belge*, 1950. 270 *fr*.

KENYA 1:62,500. 1 sheet. *Teddington: Directorate of Colonial Surveys*, 1949. 2*s*

MOZAMBIQUE. Carta da Colónia de Moçambique 1:250,000, 39 sheets; 1:500,000, 10 sheets; 1:2 M., 1 sheet. *Lisbon: Ministério das Colónias*, 1938–1948

NORTHERN RHODESIA VEGETATION-SOIL MAP. 1/1 M. *Lusaka: Dept. of Agriculture*, 1948. 5*s*. *with accompanying memorandum*

TANGANYIKA. Atlas of Tanganyika Territory. 2nd Edition. 18×18½. 34 plates of maps. *Dar es Salaam: Dept. of Lands and Mines*, 1948, 50*s*

TANGANYIKA PRELIMINARY PLOT 1 : 50,000, 10 sheets. *Teddington: Directorate of Colonial Surveys*, 1950. 2*s*. *each sheet*

TUNISIE AU 500,000e. 2 sheets. *Paris: Institut Géographique National*, 1948. 15 *fr*.

UGANDA. 1 : 50,000, Preliminary Plot. 6 sheets. *Teddington: Directorate of Colonial Surveys*, 1950. 2*s*. *each sheet*

AMERICA

CANADA. 1 : 50,000, 6 sheets; 1 : 63,360, 12 sheets; 1 : 250,000, 2 sheets; 1 : 253,440, 3 sheets. *Ottawa: Dept. of Mines and Resources and Dept. of National Defence*, 1949

UNITED STATES. Geological Survey, Quadrangle Topographic sheets, 1 : 24,000, 250 sheets; 1 : 31,680, 2 sheets; 1 : 62,500, 111 sheets. *Washington*, 1949

UNITED STATES. Transportation Maps 1 : 250,000. Indiana, 8 sheets, West Virginia, 5 sheets. *Washington: Dept. of Commerce, Bureau of Public Roads*, 1946–1947

U.S. LAKE SURVEY, 19 sheets. *Detroit: U.S. Lake Survey Office*, 1945–1948

MEXICO. Carta General del Estado de Tabasco 1 : 200,000. *Tacubaya: Direccion General de Geografia y Meteorologia*, 1946

ARGENTINA. Carta Topográfica de la República Argentina. 1 : 25,000, 3 sheets. 1 : 50,000, 11 sheets. 1 : 100,000, 22 sheets. 1 : 500,000, 9 sheets. *Buenos Aires: Instituto Geográfico Militar*, 1948–1949

BRAZIL. Atlas Pluviométrico do Brasil (1914–1938). *Rio de Janeiro: Departamento Nacional da Produção Mineral*, 1948

FRENCH GUIANA. Esquisse Photogrammétrique de la Guyane Française. 1 : 100,000, 28 sheets. *Paris: Institut Géographique National*, 1947–1948

AUSTRALASIA AND PACIFIC

AUSTRALIA. Aeronautical Map, 1/1 M, 5 sheets. *Canberra: National Mapping Section*, 1948–1949

NEW HEBRIDES. Archipel des Nouvelles-Hébrides. 1 : 500,000, 2 sheets. *Paris: Institut Géographique National*, 1949

ANTARCTIC

FALKLAND ISLANDS DEPENDENCIES, 1 : 500,000. Sheets, D, E, H, L; South Georgia; South Sandwich Islands. *Teddington: Directorate of Colonial Surveys*, 1949. 3*s*. *each sheet*

HEARD ISLAND from Survey by Australian National Antarctic Research Expedition, 1948. 1 : 83,000. *Hydrographic Branch, Dept. of the Navy, Australia*, 1949

THE SOCIETY'S NEWS

MEDALS AND AWARDS 1950

His Majesty the King has approved the award of the Royal Medals as follows: *The Founder's Medal* to Mr. George F. Walpole, Director, Department of Lands and Survey, Kingdom of the Jordan, for his contributions to the mapping of the Western Desert of Egypt; *The Patron's Medal* to Professor Harald Sverdrup, Director of the Norwegian Polar Institute, for his contributions to polar exploration and for his oceanographical investigations. The Council has awarded *The Victoria Medal* to Professor Emmanuel de Martonne, Honorary Director of the Geographical Institute, University of Paris, and Honorary President of the International Geographical Union, for his studies in physical and regional geography; *The Murchison Grant* to Surgeon Commander E. W. Bingham, O.B.E., R.N., for his services to Antarctic exploration as leader of the Falkland Islands Dependencies Survey Expedition, 1945–47; *The Back Grant* to Mr. R. G. Goodchild, Deputy Director of the British School at Rome, for his archaeological reconnaissances and surveys of the Roman frontier zone of Tripolitania, 1946–49; *The Cuthbert Peek Grant* to Mr. R. F. Peel, lecturer in Geography in the University of Cambridge, for work on the ethnology and morphology of parts of the Libyan Desert and on the morphology of Northern English rivers; *The Gill Memorial* to Dr. E. C. Willatts, Senior Research Officer, Ministry of Town and Country Planning, for his work for the Land Utilisation Survey of Great Britain and for geographical studies in Palestine with the Anglo-American Commission, 1946. The Medals and Awards will be presented by H.R.H. The Duchess of Kent at the Annual General Meeting in June.

THE QUEEN MAUD LAND EXPEDITION

On February 10 an air reconnaissance by Flight-Lieutenant Tudor at last revealed a possible winter base for the Norwegian–British–Swedish Expedition. His observations were confirmed by Captain John Giaever, the Norwegian leader, and by G. de Q. Robin, senior member of the British party, both of whom were flown over the site which lies in about 69° S. 11° W. After ground reconnaissance, the site for 'Maudheim' was finally selected and unloading started. The base lies 4 kilometres inland from the small bay where the unloading took place. Here as elsewhere in this part of Princess Martha Land, the shelf ice is afloat. East and west along the coast, the 100 foot high ice-cliffs stretch for mile after mile. In a niche, a miniature bay no more than 80 yards wide, the *Norsel* lay alongside the only place where the ice surface sloped down to within 12 feet of the sea. South, the ice-sheet stretches in an unbroken white expanse for many miles. Against this background, 'Maudheim' appears in the air photographs brought back by the R.A.F. as nothing more than a black speck. The only peaks seen so far by the expedition were sighted by Squadron-Leader Walford from the air in about 74° S. 13° W. in the general area of the easternmost German air reconnaissance of 1939. By 22 February unloading had been completed and the huts partially erected. In this the three mechanized snow vehicles, apart from some preliminary trouble with fan-belts, proved an outstanding success.

The return journey of the *Norsel* was full of hazards. Only by using 50 kilograms of dynamite, and at the cost of substantial damage to her rudder, did she

penetrate the 300 mile stretch of pack-ice; she eventually reached Cape Town early in March. With her returned the R.A.F. unit (less Corporal Quar who with official permission has joined the wintering party), Mr. Philip Law and Dr. J. A. King, the Australian and South African observers, and Mr. Stobart.

Meanwhile, at Maudheim, the base camp is complete and by comparison with most expeditions almost luxuriously equipped. Sledge journeys have already started. Meteorological work, using *Rawin*, is in full swing and glaciological investigations, in many ways the central feature of the expedition's scientific programme, are under way. At home, Squadron-Leader Walford and Flight-Lieutenant Tudor are working on their reports and a large collection of photographs at the expedition's British headquarters in the R.G.S. and in May there was a meeting in Oslo of the International Committee to consider plans for the next season. On one thing at any rate, everyone is agreed. This first international Antarctic expedition has made an excellent start; in large measure due to the remarkably skilful ice navigation of the *Norsel's* skipper, Captain Jakobsen, aided by the reconnaissance flights of the R.A.F.

SURVEYING INSTRUMENTS ADDED TO THE SOCIETY'S COLLECTION

The Society's stock of surveying instruments for loan to travellers was considerably depleted during the war, when many instruments were handed over to Service departments, and it has been found difficult to replace them. But the following have been bought during the past year.

A Kern DKM 1 theodolite reading direct to 10 seconds and by estimation to 2 seconds. This instrument is of an entirely new design and has only just been received in this country, with its case and tripod it weighs only 14 pounds; we hope to publish a full description of the instrument later. Two optical-scale micrometer theodolites reading in grades to the equivalent of 1 second of arc. Six aneroid barometers, graduated to 12,000 feet and reading to 50 feet. One aneroid barometer graduated to 7000 feet and reading to 10 feet. Two 18 inch by 18 inch plane tables. Two sun compasses similar to the Coles pattern. Two R.A.F. landing compasses.

A BEQUEST TO THE SOCIETY

By the will of the late Mrs. Frances Barbara Hyde-Maberly the Society inherits the residue of her estate, which, when other legacies and the Duty have been met, may amount to about £40,000. Our generous benefactress was the widow of the late Frank Hyde-Maberly, D.M., and both she and her husband were Fellows; they had on several occasions visited East Africa, the Cape and Scandinavia and regularly attended the Evening Meetings of the Society. Mrs. Hyde-Maberly was an enthusiastic reader of the *Journal* and in later years, when her sight was failing, continued to have it read to her by her companion.

AWARD OF THE GEOGRAPHICAL ESSAY PRIZE

On the recommendation of the examiners, the Council has this year awarded the Geographical Essay prize of £10 to Mr. J. R. Sparey of Trinity College, Cambridge, for an essay on "A regional survey of the parish of Titchfield in the County of Hampshire." Mr. D. M. Hill, London School of Economics, was *proxime accesit* with an essay on "Rural settlement in Yamaguchi Prefecture, Japan."

The prize is awarded each year for either a critical survey of recent additions to knowledge in a limited geographical field or a discussion of some current problem in its geographical aspect. Candidates must be registered students

The landing on Queen Maud Land, February 1950

R.A.F. Auster taking off near the ice barrier

Phots. J. A. King

The base at "Maudheim"

reading Geography at a university of Great Britain or Northern Ireland during the academic year in which they submit the essay. Essays submitted for the next award must reach the Director and Secretary by 15 January 1951.

THE GINO WATKINS MEMORIAL FUND

This fund is administered for the Scott Polar Research Institute by a committee appointed by the Trustees: this Society and Martin's Bank. The following grants have been made for 1950; to Mr. F. White of St. John's College, Cambridge, for work in Lapland, £15; to Miss M. C. Findlay of Girton College, Cambride, for work in West Greenland, £10. The Watkins Award for 1950 has not been made.

THE KOSMOS CLUB

Before the war the Kosmos Club, a dining club supported by Fellows of the Society, met before Evening Meetings. It was suspended during the war and it is now proposed to revive it if sufficient support is forthcoming. Fellows who would be interested in its revival are asked to communicate with the Secretary of the Club, at the Society's House, who will be glad to supply further details.

THE RECORD

THE CENTENARY OF THE ROYAL METEOROLOGICAL SOCIETY

The Royal Meteorological Society, oldest society of the kind in the world, founded on 3 April 1850 as the British Meteorological Society, incorporated by Royal Charter in 1866 and becoming "Royal" in 1883, has lately celebrated its centenary under the presidency of Sir Robert Watson-Watt. The proceedings took place first in Oxford between March 28 and 31, and then in London on April 1 and 3. Those attending its Oxford meetings, among whom were many distinguished foreign meteorologists, registered at Christ Church, and the symposia, which included discussions on climatic change and the relation of weather to everyday life, took place at the Clarendon Laboratory. On the afternoon of April 1, Sir Nelson and Lady Johnson gave a reception at the Harrow branch of the Meteorological Office where the visitors were shown work carried on there and also had the opportunity to see a radio-sonde balloon sent up from the roof in a high wind. At a conversazione held in the evening at the Society's house in Cromwell Road quite an exciting film was shown by an American delegate, of the extremely rapid development of gigantic thunder clouds in the Teton Rockies of Colorado where violent storms are characteristic of the climate. During the forenoon of April 3, Sir David Brunt entertained a party at the Meteorological Department, Imperial College of Science and Technology, where a discussion on atmospheric turbulence took place. At the centenary meeting in the Society's house in the afternoon, messages of congratulation were read from His Majesty the King, as the patron of the Society, and from a large number of meteorological services, societies and kindred institutions in many lands. An address was delivered by Professor Vening Meinesz, Director of the Dutch Meteorological Service and well known for his researches on gravity at sea. It comprised a general survey of the importance of meteorology in human welfare but, as befitted the occasion, dwelt also on grave moral issues

arising from the menace to mankind of modern weapons of destruction. In the evening the celebrations ended with a banquet at the Connaught Rooms.

In connection with the Centenary an exhibition of instruments, charts, books and photographs, which will remain open at the Science Museum till the end of June, provides a useful epitome of the vast progress of meteorological science from humble beginnings. The Centenary has indeed fallen at an auspicious time both in relation to the range of activities of the Society itself and the advancement of the science which it was founded to promote. The coming years are sure to bring great advances in our knowledge of weather processes, but it should be noted that those best qualified to judge do not foresee spectacular developments in weather forecasting. The number of variables in the problem is very great; and it may be recalled that many years ago it was shown that, even if enough simultaneous observations could be obtained from all over the globe at various levels, for the physical state of the atmosphere to be diagnosed, the next phase would have passed before it could be predicted by calculation. L. C. W. B.

A WEST AFRICAN SCIENTIFIC CONFERENCE

The third meeting of the Conférence Internationale des Africanistes de l'Ouest was held at Ibadan, Nigeria, in December 1949. Earlier meetings had been at Dakkar in January 1945 and at Bissão in December 1947. Mr. J. C. Pugh of University College, Ibadan, who represented the Society at the Conference, has sent us an account from which the following has been abstracted.

The work of the Conference was divided into three sections to cover Physical, Biological and Human interests, and some seventy papers were read. It is hoped that these and a large number of additional contributions, for which time could not be found in the programme, will be published as the *Comptes Rendus* this year. The Physical Section held meetings covering West African soils and laterites, general geology, climatic changes, erosion surfaces and cartography. The latter meeting produced contributions of great interest on the provisional ethnic and demographic 1/M. sheets of West Africa, the first sheets of a 1 : 200,000 ecological series of the French territories and maps, from aerial photographs, of population groups in parts of Portuguese Guinea where tribal distribution can be identified by individual and widely differing agricultural activities. The Biological Section covered a wide range of subjects, broadly divided into Botany and Agriculture, Zoology, Trypanosomiasis and Medicine. In the Human Section the subjects were Social Anthropology, History and Prehistory, Art and Ethnology. This Section attracted the greatest number of delegates and accounted for approximately half the papers presented to the Conference. In addition there was a plenary session to review the progress made by the Institut Français de l'Afrique noire with the West African Atlas and discuss inter-territorial cooperation towards the extension of the work. The conference at Ibadan was followed by six days of excursion; to the Jos plateau for the Physical and Human Sections, and to Benin and Zaria for the Biological Section.

The International Committee of the Conference was pleased to accept an invitation made on behalf of the Spanish Government to hold the next meeting in Fernando Po in 1951.

While bearing in mind that the C.I.A.O. is not intended to be a conference of geographers, the Ibadan meeting emphasized two points regarding geographical research in West Africa. Firstly, by far the greatest activity is in the human field, but with a strong tendency towards a sociological rather than a geographical basis; with physical studies showing a heavy bias towards pure geology or agri-

culture, the dangers of a rift in geographical research are greater here than in Europe. Secondly, on the official side even individual British territories lack any coordinating geographical organization such as IFAN in the French colonies: the Conference showed that while individual officers in the British Colonial Service find time for investigations of geographical interest, there is no organized body to correlate such work. In a country like Nigeria, where the emphasis is on development, but where necessary geographical data are scanty or uncoordinated, much could be done by a small central organization capable of suggesting and correlating spare-time investigation by interested officials, and of extracting useful material from the files of other departments.

THE INTERNATIONAL GEOGRAPHICAL UNION

The first meeting of the British National Committee for Geography to be held since last year's international congress at Lisbon took place at the Royal Society on 6 February 1950. Recent changes in the Committee were reported in the *Journal* (115 (1950) 125) and Mr. L. P. Kirwan has since been appointed by the Royal Society as an additional member. A sub-committee to deal with day-to-day international relations was set up, its members being Brigadier Bagnold, Professor Stamp, Professor E. G. R. Taylor, Mr. Wordie and Mr. Kirwan. The Executive Committee of the International Geographical Union is to meet in London from 28 to 30 August 1950 and it is hoped to arrange a joint meeting with the British National Committee at the Royal Society.

We have received the first issue of the *Newsletter* which the International Geographical Union is to publish twice a year. Printed in French and English, it deals with the current affairs of the Union and the Commissions which it has set up, and includes items of academic news and notes on the geographical activities of other institutions. Those whose interests require them to keep in touch with this field of activity are invited to apply at once to the Society for the inclusion of their names in the distribution list.

Preliminary reports from the Commissions on the International Map of the World, on Ancient Maps, on Periglacial Morphology and on Regional Planning have been placed in the Society's Library.

UNIVERSITY NEWS

UNIVERSITY OF CAMBRIDGE

Professor Steer's term of office began on 1 October 1949. Two new members joined the staff at the same time: Mr. A. T. Grove returned to Cambridge after two years of research on soil erosion in Nigeria, and Mr. B. W. Sparks came to us from Queen Mary College, having been trained at University College, London, and so brings to Cambridge a fresh and welcome viewpoint which clinches the many contacts we had with other London colleges during wartime evacuation to Cambridge.

A notable change is the increase in the number of Colleges which now actively support the subject by including geographers on their staffs. Mr. Peel was elected to a Fellowship at St. Catharine's in succession to Professor Steers, who transferred to a Professorial Fellowship. Mr. Lewis was elected to a Fellowship at Trinity College, and Mr. Caesar to one at Selwyn College. Neither of these two Colleges had previously had geographers on their staffs. With Miss Mitchell and Miss Sweeting, Fellows of Newnham College, Mrs. Anderson of Girton College and Mr. Farmer of St. John's College, and with Mr. Thatcher Censor, and Mr. Williams Bursar, of Fitzwilliam House, members of the Geography Department are well represented in the various Colleges of the University.

Dr. Pounds, who is at present a tutor at Fitzwilliam House and who has lectured frequently and supervised regularly since coming to Cambridge, will shortly be leaving to take up an Associate Professorship at the University of Indiana in the autumn term. Dr. Pounds took Professor Hartshorne's place at the University of Wisconsin while the latter was on leave of absence.

The embarrassing post-war increase in the numbers of students reading the subject may now have ceased; the first year entry was substantially less this year than for several years previously, and fewer than usual transferred to the second year course from other subjects. Since the size of the Department, gauged by the number of students, is still a matter of speculation, no ambitious building programme is envisaged in the next quinquennium, though it is hoped to increase the size of the earth-sculpture laboratory.

The main problem at the moment is the revision of the Tripos. It is too early yet to say anything at all definite on this matter, but it seems probable that the present Qualifying Examination, taken at the end of the first year, will give place to a Preliminary Examination. This will bring the Tripos more in line with some others, and will have the great advantage of making Part I a two-year unit.

From accounts which reach us, Professor Debenham is having a most strenuous and exciting time in Africa looking further into the question of water resources. Whilst on trek in the Kalahari recently, he explained that he was doing all the things he had most longed to do as a boy. W. V. L.

SCOTT POLAR RESEARCH INSTITUTE CAMBRIDGE

Dr. G. C. L. Bertram, Fellow of St. John's College, has been appointed Director of the Institute in succession to the Rev. W. L. S. Fleming, who has left Cambridge on his appointment to the Bishopric of Portsmouth.

UNIVERSITY COLLEGE OF NORTH STAFFORDSHIRE

Mr. S. H. Beaver, Reader in Geography at the London School of Economics and Political Science, has been appointed to the Chair in Geography at the new University College of North Staffordshire at Stoke-on-Trent.

THE NEW ISLANDS IN FOXE BASIN

The announcement of the sighting from the air of uncharted islands in Foxe Basin on the western coast of Baffin Island in July 1948 gave rise to the general impression that new land had been discovered. A subsequent photographic flight made in August of that year revealed the existence of three large islands with a total area of about 6000 square miles, and they have since been named by the Geographic Board of Canada. The largest is now Prince Charles Island, the south-eastern island Air Force Island and the northern, and smallest, Foley Island; in honour of J. H. Foley, the navigator of the photographing aircraft, who was later killed in a flying accident. All three islands were visited by Peterhead boat in the summer of 1949 by a party sent out by the Geographic Bureau (Canada, Department of Mines and Resources).

Mr. T. H. Manning, who was a member of the Peterhead boat party, has furnished us with a note on the islands from which it is apparent that all three had in fact been sighted before 1948. Captain W. A. Poole in the *C.G.S. Ocean Eagle* anchored 4 miles off Prince Charles Island in September 1932.[1] From his anchorage, in latitude 67° 47′ 28″ N., the coast was visible for 15 miles to the

[1] 'Navigation conditions in Hudson Bay and Strait during the season of navigation 1932,' Ottawa, Dept. of Marine, 1933, pp. 28–37.

north and south; C. P. Edwards referred to the discovery as "Poole Island,"[1] though neither the name nor the outline appeared on any published map. Mr. Manning himself worked in this area in 1938–41 and in the map accompanying his paper [2] in the *Journal* the northern parts of Foley Island are named "Anderson Island," the small peninsula at the northern end of Air Force Island is shown in dotted outline as a small low island.

WINTER CLIMATE AND OPEN WATER IN THE ARCTIC

Detailed information on the relation between winter climate and unfrozen sea is contained in a recent paper in *Arctic* [3] by F. Kenneth Hare and Margaret R. Montgomery.

The first part of the study deals with meteorology and the second with glaciology. The mean isotherms for the months October to April inclusive disclose three "gulfs of warmth" in the air over Davis Strait and Baffin Bay, over Hudson Strait all through the period, and over the eastern part of Hudson Bay in the earlier part of the winter only. Those seas are known to contain much open water through the effect of such factors as high winds, the turbulent mixing of warm and cold layers, the upwelling of warmer water and the excessive tidal range. Throughout the year, but especially in winter, the east coast of Baffin Island has a much more severe climate than the west coast of Greenland Thus at Clyde River the average temperature in December is some 25° F. lower than it is on the opposite coast at Disco Island, only 375 miles distant. A wide impenetrable barrier of pack ice blocks the Baffin coast whereas open water extends along the Greenland shore northward to Smith Sound, and even in the south, where ice from the east coast drifts round Cape Farewell, there is a belt of open water between it and the Baffin ice. The actual temperature on the west coast of Greenland, though so much higher than that of the east coast of Baffin Island, is yet far below freezing point and it is shown that the relative warmth can only be due to the closeness of the open water and not to the dynamical heating of air descending from the plateau. Similarly, everything points to the known permanence of open water in Hudson Strait as the cause, not the effect, of the relative warmth of the air over it. The case of the eastern side of Hudson Bay is of particular interest. The central portion of this enclosed sea has long been supposed never to freeze over. Its eastern shore, with its abundance of cloud and precipitation, is much warmer from October to January than its western shore, or the interior of Ungava—Labrador; but this difference ceases abruptly from January onwards, and there is no more precipitation on the eastern shore. This led the authors to suspect that Hudson Bay really does freeze over after December. Their surmise has been verified by aerial reconnaissances undertaken by the Royal Canadian Air Force in the early months of 1948 and 1949. These are to be continued over a longer period to corroborate the evidence. The heavy snowfall, due to convectional turbulence, when the onshore winds blow over the bay during the early winter and the absence of a heavy snowfall when the sea surface freezes and becomes much colder, is an instructive illustration of the dependence of weather on geographical factors. The study also reminds us that there are as wide variations in the degrees of cold experienced in polar regions as in the degrees of warmth in the tropics.

L. C. W. B.

[1] 'Navigation conditions in Hudson Bay and Strait during the season of navigation 1932,' Ottawa, Dept. of Marine, 1933, p. 8.

[2] "The Foxe Basin Coasts of Baffin Island," *Geogr. J.* 101 (1943) 225–51.

[3] "Open Water and Winter Climate in the Eastern Arctic of North America," *Arctic*, Vol. 2, nos. 2 and 3, September and December 1948.

THE USE OF "SHORAN" IN THE TRIANGULATION OF CANADA[1]

In Canada, accelerated economic development has necessitated the production of large-scale maps in scattered areas where no control exists and small-scale maps (from air photographs) have had to be tied down to a control of astronomically fixed points. Such a control is unsatisfactory for larger scales, owing to the unknown deflection of the vertical in most parts of Canada. In the areas that have been geodetically surveyed, the mean deflection is 3″ and the maximum deflection so far noted is 20″.86 (2114 feet) at Cap Madelaine.

The solution of the problem of establishing an accurate horizontal mapping control by some faster method than ordinary triangulation appears to lie in the use of some form of radar to measure the lengths of the sides of the triangles, instead of using a theodolite to measure the angles. The apparatus used is "Shoran" (a modification of a war time short range aerial navigation system) in which part of the apparatus is carried in an aeroplane and the remainder is on the ground at two stations, one at either end of the line to be measured. The aircraft flies high (20,000 feet) above the mid point of the line and transmits signals, which are received by the Shoran apparatus at the ends of the line and automatically transmitted back. The times taken from the aircraft to the ends of the line and back are automatically converted into miles and recorded on dials. The measurement of any one length is made by the aeroplane flying back and forth in a figure of eight pattern and crossing the line at approximately 90° near its mid point. At the start of the run the sum of the distances of the two ends of the line is longer than the true distance; this sum decreases as the line is approached and until it is crossed, after which it increases again. The readings on the dials are recorded photographically and sixteen crossings of each line are usually made.

The apparatus was tested successfully in 1946–47 by the U.S. Coast and Geodetic Survey in a scheme which extended the triangulation of the mainland from Florida to the Bahamas and Cuba. In Canada a network of triangles has been planned commencing at two first order stations in south-east Manitoba and extending through some 1100 miles to close on two first order stations in Saskatchewan and Alberta. The average length of side is 202 miles, and it is hoped to close the network in the summer of 1950.

Electro-magnetic waves travel along the line of sight at the velocity of light (186,219 miles per second) and, to measure a distance to within 25 feet, Shoran must be capable of recording the elapsed time to a forty-millionth of a second. This Shoran can do, and by repetition it is possible to get a result accurate to about 15 feet, a limit which is the same whether the distance be 1 mile or 200 miles. The method can only be used satisfactorily therefore for the measurement of long distances, and in the present case, where the average length of side is 200 miles, the accuracy of measurement is in the order of 1/67,000 or equivalent to that of secondary triangulation.

With no angular measurements or checks there is a tendency for the whole system to "swing" and it has therefore been found essential to include in the system some shorter sides, of which the ends are intervisible, and to determine the azimuths of these sides astronomically.

The density of control points provided by this method is meagre, but it is nevertheless of a known accuracy throughout, and the network can be filled in with more control by conventional means and in widely separated areas. This then is the solution of the problem for, when the Shoran net is complete, large-

[1] This note is based on articles that have appeared recently in the *Canadian Surveyor*, January 1950, and the *Empire Survey Review*, October 1949.

scale maps can be started anywhere in the network, as and when economic development requires it; and, provided the new maps are tied into the Shoran control, they can later be used in the compilation of the final comprehensive map. It is worth noting too that once the Shoran system has been set up, it can be used for plotting automatically the position of a photographing aircraft, which serves the double purpose of controlling the position of the lines of flight and recording the aircraft's position at the time of each exposure.

The network in Canada has not yet been completed, but it is hoped that a full analysis of the method will be possible in 1950–51, when the closure on the second pair of "first order points" has been made. A. S.

THE VOYAGE OF *R.R.S. DISCOVERY II*

The Royal Research Ship *Discovery II*, Commander J. F. Blackburn, now taken over by the National Institute of Oceanography,[1] will sail in May on a voyage of deep sea research in the southern Indian and Pacific Oceans and in the Antarctic. The main purpose of the voyage is to complete the surveys of the former Discovery Committee, interrupted by the war, of the oceanographical factors necessary to investigations on whales and other forms of oceanic life.

The voyage is to last about a year and a half and, on the outward passage, observations will be made in the little known central Indian Ocean. The regular work will begin after the ship leaves Colombo and will be continued south to the Antarctic pack-ice; she will then work eastwards into the southern Pacific. The special investigations to be undertaken include echo sounding and the taking of ocean bottom cores and seismic soundings by the methods used on the Swedish *Albatross* expedition.[2] The convergences of water masses and the seasonal distribution of pack-ice will receive attention and it may be possible to chart parts of the Antarctic coast. Routine meteorological observations will be maintained. The four scientific officers and three assistants are led by Dr. H. F. P. Herdman, and Dr. N. A. Mackintosh will sail with the ship for the first part of the voyage.

A NEW MAP BY THE SWEDISH GEOLOGICAL SURVEY

The recently completed *Jordartskarta Över Södra Och Mellersta Sverige*, by K. E. Sahlström (scale 1 : 400,000) covers in three sheets the whole of Central and Southern Sweden on a scale intermediate between the older 1 : 50,000 drift edition and 1 : 1,000,000 solid edition. It therefore fills a long felt gap in Swedish geological maps and combines on a useful scale the essential details of the distribution of the complex quaternary deposits with the exposures of the underlying basement rocks.

The intricacies of the solid geology have been overcome by mapping them lithologically in five groups: limestones, slates and shales, sandstone, plateau diabase and Archaean rocks (including some younger volcanics). This simplification is accompanied however by an inset map on a scale of 1 : 2,000,000 depicting the major distributions of the solid Geology. The glacial and post-glacial drifts and sediments are mapped in clearly distinguishable colours and are classified in the following groups: moraine, morainic clay, esker and gravel, sands, clays and biotic deposits (such as muds and peats).

The map gives an exceedingly informative picture of the intimate relationships of the ancient and more modern components of the Swedish land surface. It provides a basis for studying soil distribution throughout the most populated part of Sweden and is in many ways most valuable to the geographer. The

[1] *Geogr. J.* 115 (1950) 129.
[2] *Geogr. J.* 114 (1949) 151–6.

clarity of detail and the excellent choice of colour will commend themselves to all users of the map, although the omission of translated captions and keys may be considered unfortunate in a production which will certainly be widely used outside Sweden. R. T. C.

THE AMNE MACHIN RANGE

From time to time reports are circulated of a peak in Western China alleged to be "higher than Everest" and frequently stated to be in the Amne Machin range. A flight recorded in *Berge der Welt*, vol. 3, appears to have disposed of this possibility effectively. It was carried out by Moon Chin, vice-president of the Central Air Transport Commission of China, who, with a small party, flew from Shanghai to Lanchow on 15 April 1948. On the following day he carried out a reconnaissance by air of the great upper bend of the Hwang-ho during which the Amne Machin range was photographed. The highest peak of the range did not exceed 6000 metres and the surrounding region and valley bottoms scarcely exceeded 3000 metres. On the return flight, via Chengtu, the plane flew over the Minya Gongka range: no previously unknown peaks of exceptional height were sighted, and there is little doubt that Minya Gongka (7590 metres) is the highest peak in China.

A GEODETIC CONFERENCE IN GERMANY

Under the auspices of the German Survey Society (Deutscher Verein für Vermersungswesen), a "Geodetics Week" is to be held in Cologne from 2 to 7 August 1950. Those who wish to attend the conference should apply to Herr Vermersungs-und-Liegenschaftsrat Ewringen, Globushaus, Hohestrasse, Köln (22c), Germany.

LE PLAY SOCIETY SUMMER EXCURSIONS

The Le Play Society will conduct three summer excursions in physical and social geography, geology and botany in August 1950. The excursions are to Mayrhofen in the Austrian Tyrol, to Clermont-Ferrand in the Auvergne and to Dartmoor and the south Devon coast. For further particulars application should be made without delay to the Director, Miss Margaret Tatton, The Birlings, Birling Gap, Eastbourne.

CAREERS FOR GEOGRAPHERS

The Town Planning Institute was wrongly referred to in the last issue of the *Journal* (115 (1950) 96) as the "Institute of Planning." It has also been pointed out by the Institute that the Final Examination for Associate Membership includes a paper on "Elements of Applied Geology and Economic Geography"

OBITUARY

HUGH ROBERT MILL, D.SC., LL.D.

Hugh Robert Mill, a former Librarian, Vice-President and Gold Medallist of the Society, died on April 5 in his eighty-eighth year. For many years he was closely associated with the progress of geography in this country, and earned special distinction as the historian of Antarctic exploration and for his contributions to meteorological science. Born at Thurso, one of a family of eleven, he was handicapped by poor health in his youth; despite this he gained the Doctorate of Science of Edinburgh University and, specializing in marine

chemistry, worked for a time on the *Challenger* reports. His interests soon widening to embrace first physical and then general geography, he had established himself as a lecturer in geography when he was appointed in 1892 to succeed J. S. Keltie as Librarian of the Society. With Keltie, Mackinder, Chisholm and others, he became a member of the group then working actively to reform geographical education. He was thus one of the founders of the Geographical Association (he was its President in 1931–33), and wrote a number of books designed to set forth the new outlook. His 'Realm of nature,' a textbook of physiography, first published in 1891, went to a third edition thirty-three years later. A project for which he worked hard at this time, a description of England based on the Ordnance Survey sheets, is only now in sight of realization. From his father, who had sailed as surgeon in a Dundee whaler to the Arctic in 1826, Mill had an early interest in Polar matters; he therefore entered with enthusiasm into assisting in the organization of the National Antarctic Expedition of 1901–04 under Captain R. F. Scott in the *Discovery*, and later sailed in her to Madeira to give practical instruction in meteorology and oceanography to the scientific staff. Later he became the friend and adviser of many Polar explorers, the author of a standard book on Antarctic exploration, 'The siege of the South Pole,' and the sympathetic biographer of Sir Ernest Shackleton. He left his extensive Polar Library to the Scott Polar Research Institute, Cambridge, having been a member of its committee of management until 1939.

Another of Mill's life interests was meteorology and particularly the study of the geographical distribution of rainfall. In 1900, on the death of G. J. Symons, he resigned from the Society's staff to become Director of the British Rainfall Organization until 1919, when he handed it, with its valuable series of records, over to the Meteorological Office. He was President of the Royal Meteorological Society in 1907–08, and had received the Symons Gold Medal of that Society in 1918. To mark its recent centenary, it established a Hugh Robert Mill medal, and bestowed the first upon him.

Mill continued despite this new field of activity to maintain his interest in geography. From 1917 to 1937 he was a member of our Council, and for five of these years a Vice-President (1927–32). He was an accomplished speaker, entirely independent of notes owing to poor eyesight, and for many years made a masterly contribution to the discussion following every important paper on Polar work. At our Centenary in 1930 he undertook, at the request of the Council and with the advice of Douglas Freshfield, to write the history of the Society: 'The Record of the R.G.S., 1830–1930,' which displays his wide outlook and intimate knowledge of geographical progress, and his precise yet lively style. His contributions to geography had been recognized by the award of the Victoria Medal in 1915, and it was only failing eyesight that obliged him in 1933 to decline the unanimous invitation of the Council to accept nomination as President. His standing as a geographer was also acknowledged by the award of the Gold Medal of the Royal Scottish Geographical Society in 1923, and of the Cullum Medal of the American Geographical Society in 1930.

All who enjoyed Mill's hospitality at Dorman's Park will remember him as an entertaining and instructive conversationalist, with a remarkable memory and a dry humour tempered by sentiment. G. R. C.

MARGARET SHACKLETON (MRS. F. G. MANN)

Mrs. F. G. Mann, for thirty years a fellow of this Society, died at Cambridge on 26 January 1950. She was educated at "Mayfield" (now Putney High

School), which has produced a number of distinguished geographers, and then proceeded to University College, London, where she took a B.A. (General) degree. This was before the institution of the B.A. Honours degree in Geography, for which the first examination was held in 1921. She was immediately attracted by the new degree and, coming under the notice of Professor L. W. Lyde, combined private study with helping him. Sitting as an External student, she obtained first-class Honours—a recognition of her critical and scientific mind and also of her enthusiasm for geography. She applied these gifts with marked effect for a number of years when, as Miss M. R. Shackleton, she became a lecturer in the department of her own college and a link between the regimes of Professors Lyde and Fawcett.

She lectured on the geography of Europe and worked on a manuscript, but it was after her marriage in 1930, to Dr. F. G. Mann, F.R.S., of Cambridge University, that Mrs. Mann published her chief contribution to geography. Her well-known and lucidly written 'Europe: a Regional Geography,' first published in 1934, continues to be deservedly popular as the best survey in English of this broad field. Influenced perhaps by Professor Garwood even more than by Professor Lyde, Mrs. Mann was at pains in this book to underline the stable physical patterns of our continent: "a knowledge of structure," she wrote, "is even more necessary to the geographer than a knowledge of anatomy to the artist." Before her fatal illness Mrs. Mann had completed the proof reading of the fourth edition of this work, the main novelty of which is several chapters on the regions of Russia. During the last war she resumed her rôle of lecturer, this time to students of Queen Mary College then resident in Cambridge; more recently she accompanied her husband to the University of Hawaii, and on the return journey lectured in the United States. She was turning her mind latterly to research into the demographic geography of the lower Danubian area.

Mrs. Mann's lively and cheerful personality, her carefully prepared lectures and her unfailing and kindly attention to her students have endeared her to a succession of geography graduates of University College, as well as to her colleagues.

W. G. E.

CORRESPONDENCE

SNOWFALL IN ETHIOPIA

On reading the discussion on Mr. O. G. S. Crawford's interesting paper, "Some medieval theories about the Nile" in the *Journal* of September 1949 I looked up my notes made during a nine years' residence in Ethiopia, as I had been able to make inquiries into the possibility of the Simen Mountains ever having been known as the Mountains of the Moon and the extent to which they could be described as snow mountains. I had read some of the literature and had entered on my quest with some scepticism.

The headquarters of Dejazmach Ayalewu, Governor of the Simen Province, was at Dabat (9000 feet) on the southern slopes of the Simen range and my first official visit to him was made in October 1926. There was not then time for exploration, but I hoped to get some interesting information from him, particularly as to the period of the melting of the snows. My efforts were not encouraging, for I found that there is no word for snow known to the inhabitants of the province where snow was supposed to lie on the summits. The local

people know and use only the word for hail—*barado*. I was only able to find a distinctive word for snow some years later, in Addis Ababa, from a travelled Ethiopian who had seen snow in Europe.

During the next few years I travelled extensively in Gojjam and watched for any evidence of snow on such mountains as Amadamit and Choke, with heights up to 13,000 feet, in the catchment area of the Blue Nile. I neither saw nor could hear of snow. There was hail in plenty which, at any height above 8000 feet, lay on the ground for several days and in the far distance was indistinguishable from snow. In fact had I not been in the hail storms I might have suspected that it was snow. At 7000 feet and over, ground frosts were experienced in the mornings in December and January, pails of water had a coating of ice and susceptible vegetation was turned black. Usually the sun, rising in a clear sky, soon melted the ice.

After several years spent in the country I had formed the opinion that snow did not fall in Ethiopia and that previous reports of snow mountains were in fact derived from travellers' mistaken impressions of distant hail covered mountains glistening in the sunlight.

On 13 April 1931 I started a compass traverse of the unmapped Gondar–Asmara mule track which crosses the Simen range. The height by aneroid reading at the top of the Walkafit Pass was 9800 feet; the highlands, treeless and bare and somewhat resembling Scottish moorland, slope away gradually to the east and although they rise up to Bohit (14,900 feet) there is no outstanding grandeur of scenery but, looking back, the magnificent headlands tower up into the clouds. At Walkafit there was a heavy hail storm; hail covered the ground and lay thick the following day and the Simen range was still shining white when I took my last back bearings on it some five days later, from about 30 miles to the north.

My next visit to the Simen was under different circumstances in December 1942, after the departure of the Italians, by motor car on the Italian-made roads. I had just seen the Simen highland from the east and from afar as we passed along between Dessie and Adigrat on the main Addis Ababa–Asmara road. This would be much the same distant view of the Simen as seen by Dufton [1] in April 1863. In 1942 the summits were shining whitish in the sunshine and my companions remarked that they were covered with snow. I was able to prove that not only was there no snow but not even hail when, a few days later, we drove up the Walkafit Pass on December 12 on our way to Gondar; the sun shining on the short dry grass had, in the distance, given the impression of a snow-capped range.

I was so convinced after this that snow did not fall in Ethiopia that I had been rash enough to write in some official publications that snow never fell. Soon after, on re-reading Salt's account of his travels [2] I came upon a passage, previously overlooked by me, in which his companion Mr. Pearce is quoted as having been in a heavy fall of snow in the Simen which did not "come down with violence, but quietly descended in large flakes, like feathers." He also mentions the summit of Amba Hai shown in his map as the highest point in Simen. Amba Hai was not one of the several peaks to which my guides gave a name. I was to have the existence of snow further confirmed shortly after. Major H. E. Hebbert, R.E., when on leave from the Sudan obtained permission to travel through Ethiopia in a small car and, on the way to Gondar, camped on the Simen highlands. Knowing my interest in the existence or non-existence of

[1] Dufton, 'A journey through Abyssinia,' 1867.
[2] Salt, 'A voyage to Abyssinia,' 1814.

snow, he told me that there was then quite thick snow and added that he and his wife had snow-balled each other. He also very kindly sent me a photograph showing the snow lying in patches, apparently in drifts, on the otherwise bare mountain top.

This leaves me with the impression that snow does occasionally fall in the Simen, but not in sufficient quantity to affect the flow of rivers when melting, or for the Simen to qualify as snow mountains, as that term is usually understood. The myth that there must be snow mountains in Central Africa may have arisen from the similarity between the silt-laden annual floods of the Tigris and Euphrates, which were known to the ancients to have their origin in melting snow, and the floods of the Nile, then known only in Egypt. The Blue Nile flood is now known to be caused by the drainage of heavy summer rains from the Ethiopian highlands into the large tributaries that join the Blue Nile downstream from Lake Tana.

R. E. CHEESMAN

9 *April* 1950.

To underline Mr. Crawford's suggestion that Ethiopia is by no means disqualified so far as the snow mountain tradition goes, I would refer Mr. Tracy Philipps to a paper by Erik Nilsson.[1] Nilsson's investigations prove that not only have the Simen Highlands carried snow, but there is every evidence of extensive glaciations as late as the last pluvial. He estimates that the area occupied by glaciers of the great pluvial amounted to approximately 440 sq. km., and by those of the last pluvial to about 60 sq. km. The highest peak, Ras Dedjin (4620 m.) was very extensively glacierized.

Nilsson also found evidence of former glaciers on the sister peaks, Kaka (4133 m.) and Chillalo, at the north-west corner of the Somaliland plateau. The saddle plateau between these two mountains is covered by glacio-fluvial material. He points out that "in the valleys of the western slope of Kaka the moraine ridges are magnificently well developed." Morainic deposits were also found at 3700 m. on the old volcanic peaks of Guna and Amba Farit, but are thought possibly to be remains of moraines of the great pluvial. Finally, Nilsson estimates the height of the snow line at the last pluvial to have been approximately 4200 m.

P. C. SPINK

29 *October* 1949.

Admittedly Mr. Crawford's belief of snow in Abyssinia does not pretend to refer to any other period than that covered by his lecture, namely the Medieval: roughly between the fifth and fifteenth century of our era. But may I be allowed nevertheless to put, in another and perhaps more geographical way, a point which arises from Mr. Crawford's courteous and lucid reply to what he states is my "argument," [2] based on the continuity into the Middle Ages, with which he dealt, of the classical tradition, dating from Aeschylus and Herodotus, that the Nile was fed by snow? Nowhere in the Nile Basin, save on Ruwenzori (16,800 feet), is there perpetual snow frequent or lasting enough to be a typical-enough feature of the landscape to become a byword among the heathen, like Aristotle, and the source of an (on the face of it) unlikely and striking story that a hot Egyptian desert-river was fed by snow. Can Abyssinia's Simen, or any Abyssinian heights on a longitude siting them roughly between the heats of the Negro Nile and Aden, be properly described as "snow-mountains"? In

[1] "Ancient changes of climate in British East Africa and Abyssinia," *Geografiska Annaler*, 22 (1940) 55–63.

[2] *Geogr. J.* 114 (1949) 28.

Abyssinia, after violent seasonal storms, one could indeed in our own time sometimes see certain hill-tops momentarily white with what, at a distance, appeared to be snow. But it was normally in reality only quite deep drifts of very fleeting hail. In fairness to Mr. Crawford's theory, it must be said that there is also another reference, for which I am indebted to Mr. D. R. Buxton. The inscription, from Aksum about the fourth century A.D., even alleges that soldiers had to march through knee-deep "snow."

But, in a Byzantine-time Orient, honorific inscriptions which describe conquests and other doughty deeds are often magniloquent in that they aim to present to posterity a picturesque and impressive tableau. This kind of inscription tends towards *Belles Lettres*. For the greater glory of a conquering hero, both the numbers of the enemy and perils of the way and climatic obstacles are apt to be described with considerable exaggeration. Even many and more enlightened centuries later, brave Travellers' Tales became inscriptions (on maps) which filled inner Africa with fabulous beasts. In short, much caution has surely to be exercised before we can accept, at face value, public inscriptions of royal and other exploits of that place and period. It is thus that Mr. Buxton feels, as I do, that it would appear unlikely that the classical legend [1] (of "Egypt nurtured by snow" and of the mountains, called "of the moon," whose snows feed the great lakes, sources of the Nile), had its origin in the mountains of Abyssinia.

TRACY PHILIPPS

13 *January* 1950.

MEETINGS: SESSION 1949–50

Thirteenth Meeting, 20 February 1950. The President in the Chair

Elections to Fellowship: Charles Ben Alison; David Kinloch Armstrong; Miss Audrey E. Ashworth; Brian H. Atkinson; William Gibson Baillie; James Ballard; Flight-Lieutenant Kenneth M. Beaumont, M.A.; Miss Mavis J. Board; Frederick V. Botley, B.A.; Leonard Callender; William H. J. Chippendale; W. H. Crace; William Osmond Davey; Mrs. H. R. Davies; Robert Raymond Dobbin; Miss Mabel A. Elliot; George Garside, B.SC.; Ray Yeakle Gildea; Douglas Baldock Gillert; Miss Kathleen Mary Green, M.A.; George Grimshaw; Edwin Allen Hearn; Mrs. Doris L. Hubbard; Lancelot Manby M. Ives; Henry Edwin James; The Rev. Charles A. Jamieson; Mrs. Kennett-Barrington; Douglas A. Kent; Bernard S. King; Dr. William E. Krewson; Miss Barbara Joyce Lingwood; Miss Isabel Marten; George William Maycock; Rowland Percy Moss; John Spencer Nall; Mrs. Frances M. Oswin; Leonard Jack Reddall; Norman Rosser, B.A.; Richard Irwin Ruggles, M.A.; Arthur Scholes; G. F. Scott, M.A.; Arthur Eltringham Smailes, M.A.; Miss Patricia W. Smith; The Rev. Edward Smyth; Miss Beryl Street; Anthony G. Trower; Captain J. L. H. Tudor, R.A.; Raymond V. Vernede; Rene Jacques Wetzel, B.SC.; Arthur S. Wilcockson; Ronald F. K. Worswick; Donald P. Wratten

Transferred from Associate Membership: Miss Elizabeth Langton; Miss Lorna Ogilvie Scott; Charles Russell Towns

[1] Snow-mountains called "of the moon" perhaps only because, in the descriptions, seeming something so fabulous, so distant and so pale.

Elections to Associate Membership: Henry Howard Cook; Miss Eunice Marsden; Miss Joan M. Phillips; Derek Malcolm Ricks; Miss Jean Whitam

Paper: British expedition to Nepal. By Peter Lloyd

Fourteenth Meeting, 6 March 1950. Professor J. A. Steers in the Chair

Papers: The cartographical presentation of biological distributions

17 March 1950. A meeting of the Institute of Navigation

Paper: Navigation and strategy in ocean racing. By Captain J. H. Illingworth, R.N.

Fifteenth Meeting, 20 March 1950. The President in the Chair

Elections to Fellowship: John Kenneth Amos; Colonel Herbert D. Anthony, M.A., B.SC., PH.D.; Frederick Ayer II; Philip H. T. Beckett; Pooran S. Bhakuni; Ernest Amano Boateng; Herbert Brittain, B.A.; Derek Ian Browning; William G. N. Chattey; Paul Edward Chilcott; The Rev. Albert Clarke; Gordon Cooper; Alexander N. Davidson; Wilfred Dawson; Miss B. de Cardi; Miss Eva Dunn; Vivian E. Ferrier; Miss Jean M. Fortt; Sir Arie Kok; James A. G. Marshall; Vivian W. Oelrichs; John Patrick Ough; Owen Ambrose Over; Lieut.-Colonel John L. Prescott, F.Z.S.; Geoffrey E. Salisbury; Peter John Taylor; Frank G. Thomas; Anthony Edwin Trim; Harold Wade Underhill; Dr. C. von Fürer-Haimendorf; Kenneth E. Wilderspin; Francis Wilkins

Transferred from Associate Membership: Kenneth E. Sawyer

Elections to Associate Membership: Ronald Louis Bacon; Robert F. H. Cole; Oliver Patrick Keef

Paper: The transformation of Arabia. By H. St.J. B. Philby

Sixteenth Meeting, 27 March 1950

Film: The Maya through the ages. Colour film with sound commentary

Seventeenth Meeting, 17 April 1950. Mr. J. M. Wordie in the Chair

Paper: Cambridge expedition to Spitsbergen 1949. By W. B. Harland

21 April 1950. A meeting of the Institute of Navigation

Papers: Interplanetary travel. By A. C. Clarke and R. d'E. Atkinson

Eighteenth Meeting, 24 April 1950. The President in the Chair

Elections to Fellowship: Mrs. Irmin Atkinson; George P. Barry; Nicholas E. Cleary; Arthur Thomas Cockle; Rear-Admiral Archibald Day, C.B.E., D.S.O.; Hugh K. Downie; Walter J. Feely, A.B.; Armand Felix; Miss Vera Fowler; Syed M. Z. Hasan, M.SC.; Richard Claude Haw, B.A.; Charles D. Laborde; Dr. Herbert Lockyer; M. Magrath; Edward Nevin; Leslie G. Nops; Arthur O. Nelson-Cole; John J. Pytches; Jacques Santorineos; Miss Yvonne C. Sherman; Major B. E. Smythies; Charles W. G. Starr; Ralph S. Taylor; William Neville Terry; Miss E. M. Thopson; Peter F. Wookey, B.A.; Edward Rupert Zenthon

Transferred from Associate Membership: Edward J. McCabe; William G. Tonkin

Elections to Associate Membership: J. M. Stayt

Paper: Lost medieval villages. By M. Beresford

Published June 1950

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